THE METAL INDUSTRY
WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD, THE BRASS FOUNDER AND FINISHER AND ELECTRO-PLATERS REVIEW
A TRADE JOURNAL RELATING TO THE NON-FERROUS METALS AND ALLOYS.

OLD SERIES
VOL. 16, No. 5.

NEW YORK, MAY, 1910.

NEW SERIES
VOL. 8, No. 5.

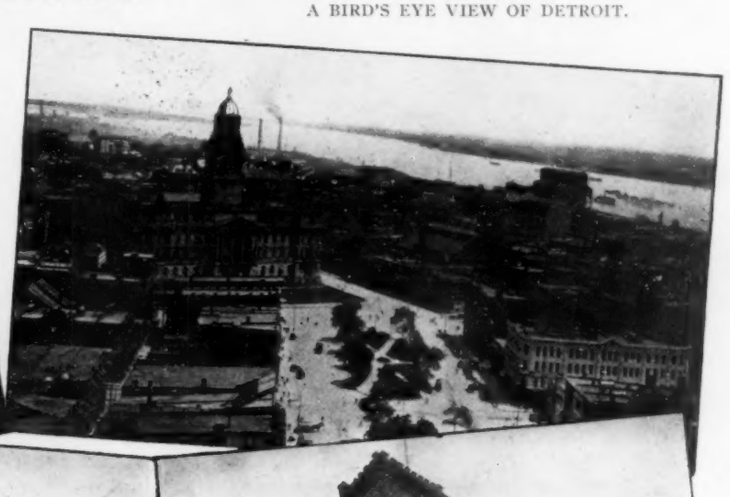
THE DETROIT CONVENTION OF FOUNDRYMEN AND MANUFACTURERS.

A COMPREHENSIVE REPORT OF THE PREPARATIONS MADE BY LOCAL COMMITTEES FOR THIS IMPORTANT EVENT.

This year, all roads traveled by the foundry devotee lead to Detroit for the week of June 6 to 10. At this time will be held the fourth annual convention of the American Brass Founders' Association in conjunction with the fifteenth annual convention of The American Foundrymen's Association and the exhibition of The Foundry and Manufacturers Supply Association. From all accounts, the exhibition will be the largest and most successful ever conducted, both in point of space occupied, in number and variety of firms represented, and in the novelty and excellence of the exhibits planned.

PONTCHARTRAIN HOTEL, HEADQUARTERS OF THE FOUNDRYMEN ASSOCIATIONS.

A BIRD'S EYE VIEW OF DETROIT.



MAIN CANAL IN BELLE ISLE PARK, DETROIT'S PLEASURE GROUND.

HOTEL CADILLAC, HEADQUARTERS OF THE FOUNDRY AND MANUFACTURERS' SUPPLY ASSOCIATION.

DETROIT THE CONVENTION CITY.

The city of Detroit, where this convention will be held is called "the gateway of the Northwest" and claimed to be the most beautiful city in the United States. Situated as it is on the banks of the Detroit river, up and down whose broad surface passes probably more tonnage than any other stream in the world, and reached by numerous railroad systems, it offers unexcelled facilities for shipping its products to all parts of the world. Aside from the commercial end Detroit offers unusual opportunities for pleasure in its amusement parks and pleasure traffic on the

water. We are assured by the committee on entertainment that the visitor to the convention will be well taken care of in this respect. Numerous excursions, including a monster boat ride in the Str. Brittania, a cut of which we show, have been planned and all these will tend to lift the fog and clear the brain after puzzling over the many new and novel devices to be seen at the exhibition.

ADVANTAGES OF THE CONVENTION.

The serious side of the convention, aside from the business and educational advantages of the exhibition itself, will be taken care of by the preparation and reading of papers dealing with both the theoretical and practical views of the metal foundry business. The papers that are already in hand and promised for the convention are as follows:

C. R. Stevenson, "Cost and Cost Systems applied"; C. P. Karr, "Analysis for Lead in Brass Alloys"; Prof. J. J. Porter, "Co-operative Course of Metallurgy"; A. L. Marsh, "Electric Furnaces for melting non-ferrous Alloys"; Dr. F. T. F. Stephenson, title to be advised later; Erwin S. Sperry, "Fluxes as applied to the Brass Foundry"; H. M. Lane, "Use of Magnesium in Deoxidizing Aluminum Alloys"; Jesse L. Jones, title to be advised later; Prof. J. W. Richards, "Electric Power required to melt Brass, Bronze, etc."

There will probably be some more papers submitted, but at this early date it is impossible to give their titles and authors, but from the above list can be gained an idea of the excellent character of those already in hand.

As a means for advertising the convention throughout the country the Detroit local committee has provided a set of lantern slides dealing with convention matters which will be loaned to any Foundrymen's organization in the country that sees fit to use them. Application for these slides, which are all properly labelled and with data to go therewith, should be made to Frank T. F. Stephenson, chairman of the local committee at once, as several Foundrymen's associations have already requested the use of these slides.

PROGRAMME OF THE CONVENTION.

The committee in charge of this matter report that while progress is satisfactory the entire schedule of proceedings has not been entirely completed and we are unable therefore to give any details other than to mention that a complimentary dinner will be given to the officers of the allied associations and the technical press on Monday evening, June 6, at the Pontchartrain Hotel, by the local committee. On Tuesday, June 7, the visiting ladies will be given a trip around the city, with a theater party in the evening. The sterner sex will be entertained the same evening at a smoker at the Light Guard Armory by the entertainment committee, of which E. J. Woodison is chairman. A number of concerns have signified their willingness to allow visiting foundrymen to inspect their plants, and this promises to be one of the most interesting features of the convention.

FOUNDRY AND MANUFACTURERS' SUPPLY ASSOCIATION.

The exhibit of this association will be held at the Michigan State Fair Grounds, 7 miles from the center of the city, where will also be held the joint sessions, as last year, of the foundrymen's associations. The buildings which will be used are shown in view and plan in figs. 2 and 3, and from the pictures can be gained an idea of the space afforded.

In this connection Secretary Hoyt of the Foundry and Manufacturers' Supply Association, reports that over 30,000 feet of floor space has already been asked for. Only about 17,000 feet were used at the Cincinnati convention, therefore the idea that the Detroit convention is to be the banner one of the organization appears to have rather a firm foundation.

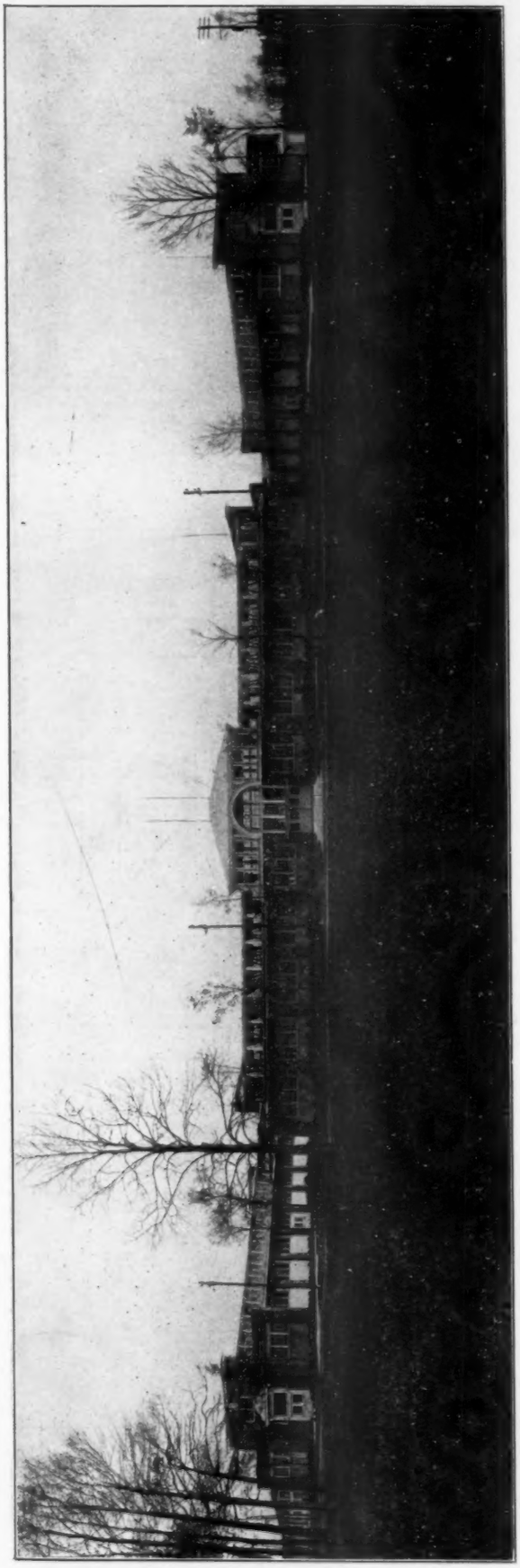
The Foundry and Manufacturers' Supply Association has decided to use a tent for a temporary building at the convention and Secretary Hoyt has made an arrangement for a tent 30 feet in width and whatever length may be found necessary. The present tent is 120 feet in length, and the ends can be winged out to any desired extent. A heavy timber partition will be put down the center of the tent, thus making a back wall for each exhibit, and the aisles will be laid on each side. This tent will of course be in addition to the three buildings on the Michigan State Fair Grounds which are shown in the illustration, and now being put in readiness for the exhibition. The tent will be used for the exhibition of brass melting furnaces, core ovens and other devices relating to the brass foundry business.

THREE IMPORTANT OFFICERS OF THE VISITING ASSOCIATIONS.

W. R. WEBSTER, President of Amerircan Brass Founders' Association.

WM. M. CORSE, Secretary-Treasurer American Brass Founders' Association.

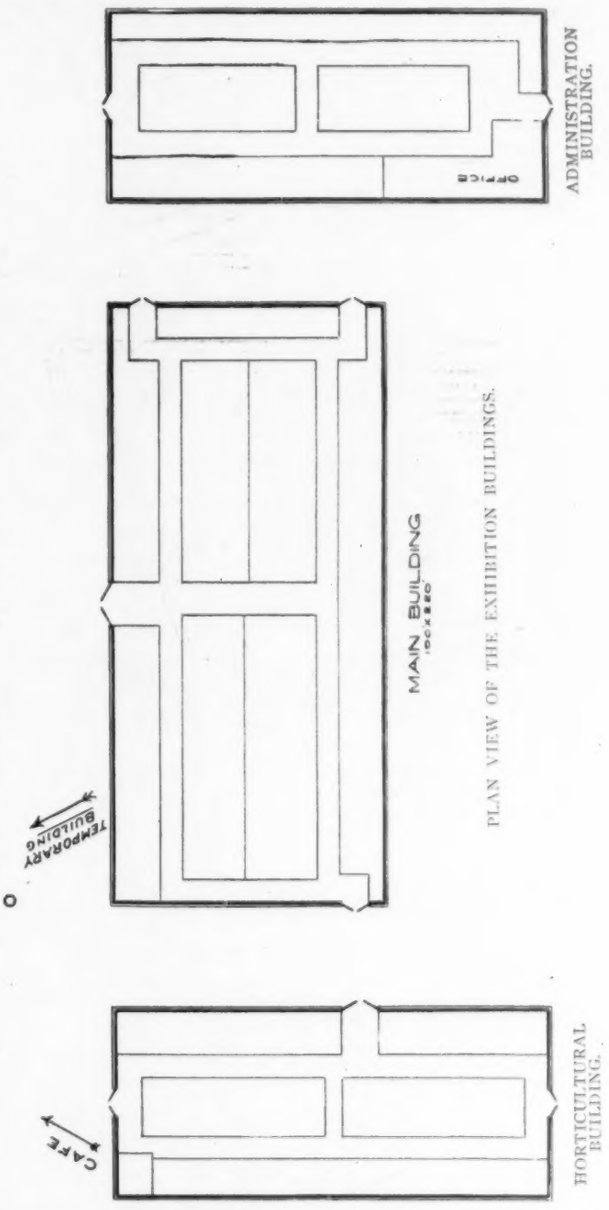
C. E. HOYT, Secretary Foundry and Manufacturers' Supply Association.



View of the principal buildings at Michigan State Fair Grounds, Detroit, where the convention sessions and exhibit are held.

REDUCED RATES BY RAILROADS.

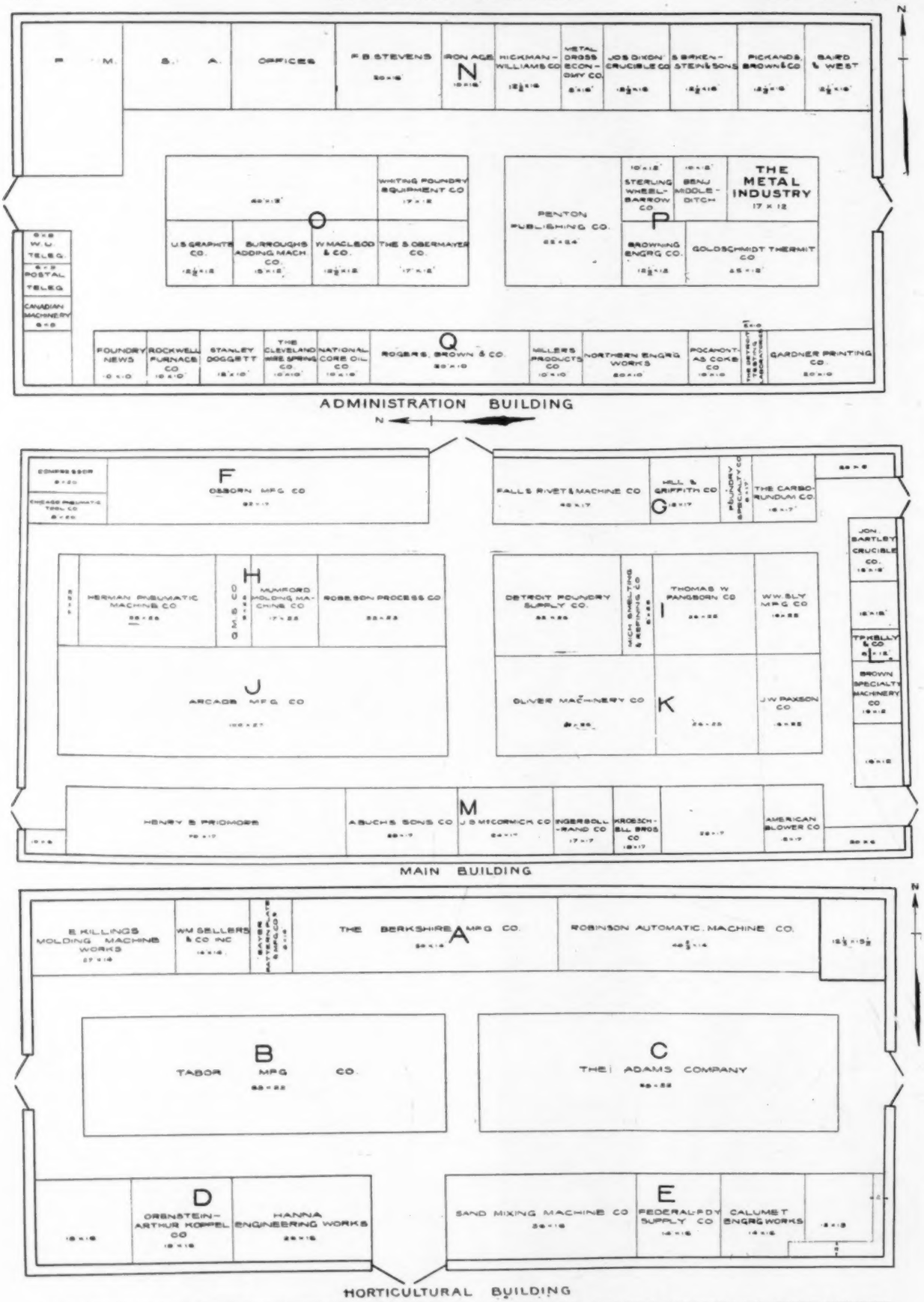
Secretary Moldenke, of the American Foundrymen's Association, reports that reduced rates have been obtained from the railroads of a fare and a half for the round trip, on the certificate plan. All those intending to go to the convention should avail themselves of this, and get certificates when they purchase their tickets. A fee of 25 cents is collected by the Joint Agent at Detroit, and it takes 1,000 certificates to make the rate available.



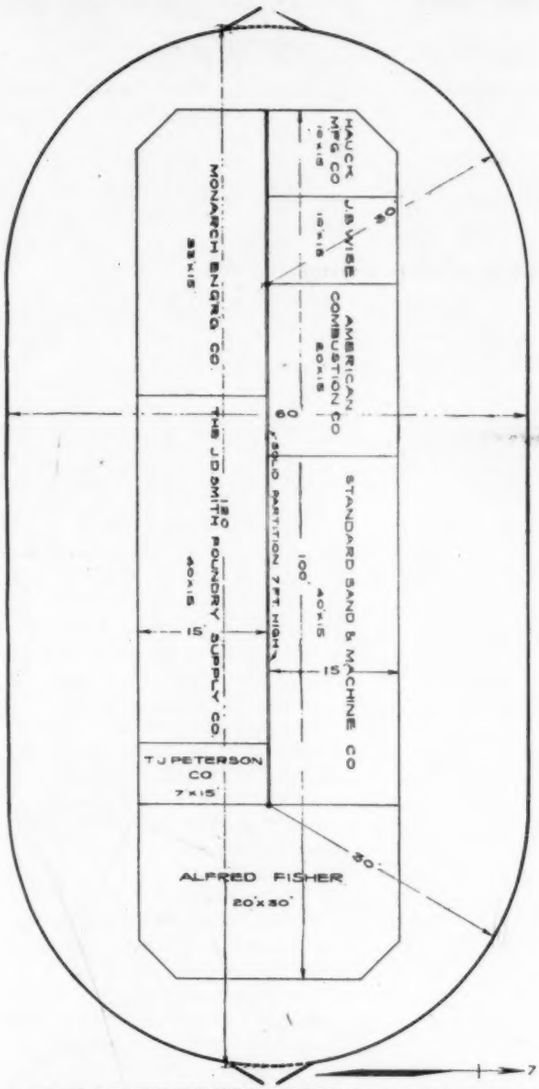
PLAN VIEW OF THE EXHIBITION BUILDINGS.

ADMISSION FEE.

Admissions to the sessions of the Allied Foundrymen's Association will be free and any one interested is cordially invited to attend. The admission to the exhibition itself will be governed by a fee of 25 cents and a season ticket can be obtained for one dollar, entitling the holder to entrance for the entire week. A plan of the principal buildings showing the names of the intending exhibitors and the location of their exhibits is shown on the following pages.



PLAN VIEW OF THE EXHIBITION BUILDINGS SHOWING THE EXHIBITORS AND THE LOCATION OF THEIR EXHIBITS.



PLAN VIEW OF THE TEMPORARY BUILDING, SHOWING LOCATION OF EXHIBITS AND NAMES OF EXHIBITORS.

In connection with the entertainment provided for the vistors, it is announced that this is only free to members of the various associations. Members may, however, obtain guest tickets at a nominal expense.

STEAMER TO BE USED FOR RIVER EXCURSION, ONE OF THE FEATURES OF THE CONVENTION.

UNITED STATES TARIFF DECISIONS.

Copper Plates are Not "Sheets," but Manufactured Metal.

The United States Circuit Court of Appeals, New York, has just sustained the decision of the United States Board of General Appraisers regarding the duty to be imposed on copper plates imported by B. F. Drakenfield and Company of New York. These plates were of planished copper of varying dimensions from 4 by 4 inches to 18 by 24 inches and one-eighth inch in thickness with beveled edges.

The court decided that the evidence supports the finding of the Appraisers Board that:

These plates are planished, and in this advanced state they are ready for engraving. . . . A somewhat elaborate, process of grinding and polishing which greatly enhances the value of the articles, is necessary in order to make the plates ready for the engraver's use. They were assessed for duty under paragraph 193, which reads:

Articles or wares not specially provided for in this act, composed wholly or in part of iron, steel, lead, copper, nickel, pewter, zinc, gold, silver, platinum, aluminum or other metal, and whether partly or wholly manufactured, forty-five per centum ad valorem.

The importers contended for free entry under paragraph 532, which says:

"Copper in plates, bars, ingots, or pigs, and other forms, not manufactured or specially provided for in this act."

The board and circuit court agreed that the plates had been advanced in value sufficiently to take them out of this paragraph.

It is further contended that they should be classified under paragraph 176:

Copper in rolled plates, called braziers' copper, sheets, rods, pipes, and copper bottoms, two and one-half cents per pound; sheathing or yellow metal of which copper is the component material of chief value, and not composed wholly or in part of iron, ungalvanized, two cents per pound.

The court says:

"The article in question, if it had been engraved, would undoubtedly be classifiable under paragraph 166."

Steel plates engraved, stereotype plates, electrotype plates, and plates of other materials, engraved or lithographed, for printing, twenty-five per centum ad valorem.

Copper in rolled plates or sheets would seem to have been provided for by Congress in paragraph 176. If the collector and the Board of General Appraisers were right in their reasoning, they would seem to be charging Congress with the intention of classifying this article at a 45 per cent. rate before it is engraved, and at a 25 per cent. rate after engraving. If the courts accepted such an interpretation, the importer would be apt to have his plates engraved on the other side of the water, to the detriment of the American engraver as well as the finisher.

MINTING OF COPPER COINS IN HONDURAS.

Vice-Consul B. D. Guilbert sends the information from Tegucigalpa that on Feb. 28, 1910, the President of Honduras was authorized to mint and place in circulation copper coins with the value of one and two cents. The mint, which had for a long time been closed, is now at work.

THE COPPER AND BRASS INDUSTRY OF DETROIT

AN INTERESTING DESCRIPTION OF THE DEVELOPMENT OF THE BRASS BUSINESS IN THIS GROWING INDUSTRIAL CENTER.

BY FRED J. HUNTLEY.

Detroit, the City of the Straits, is today pre-eminently one of the most rapidly growing municipalities in the United States. In one decade the city has developed from a population of less than 200,000 to a metropolis of over 500,000, with manufacturing industries that produce about everything demanded in every part of the world. This remarkable development is the result of work of vigorous business men who have found here on the shore of Lake St. Clair and the Detroit River one of the most advantageous points for the establishment of great industries. To the north is Canada, that is now growing with strides that are almost incomprehensible. To the south and east and west lies the greatest country on the earth.

F. J. HUNTLEY.

Detroit is a border city and is so situated as to command the trade of a vast stretch of territory. The field is so great that even the manufacturers themselves are just awakening to the great opportunities that lie before them. There are business men in Detroit today who have made millions in their manufacturing industries within the last ten years, and some even within the past five years.

In considering Detroit's great industrial progress the writer finds that the manufacture of brass, copper and aluminum stands out pre-eminently as a feature that even astonishes those engaged in it. Within the past twelve years this business has developed with leaps and bounds, and all on account of the enormous demands made on the local producers by the automobile factories. The history of the brass industry in Detroit can be traced way up north to the Upper Peninsula along the ridges towering above Lake Huron. It is in this bleak region that thousands of men are toiling day and night far below the earth's surface in mining the virgin copper that is used in such great quantities in the foundries and shops of Detroit.

The mining of copper really began first in the United States on the Lake Superior ranges of Michigan, in 1844, where the product was shipped to Detroit for manufacture into various articles. The first copper was taken from fissure veins near Copper Harbor, in Keneenaw County, Michigan. The mining of copper at that time was crude but with the advancement of the industry and the introduction of modern appliances the Lake Superior copper mines in Michigan within two decades became the most important in the United States, and the output soon became second only to Chili. The Lake Superior copper region is of exceptional nature and unusual extent, having a known length of four hundred miles, from Michipicotton Island, on the east, to within a few miles of St. Paul and Minneapolis. One of the mines in that region, and also one that supplies Detroit mills with great quantities of virgin copper ore, is that known as the Calumet & Hecla Company, which has the most extensive workings in the Upper Peninsula of Michigan. This concern was organized way back in 1871 and capitalized for $2,500,000. It gives employment to hundreds of miners and vast quantities of ore are taken from the ground every year. These workings are admirably situated so far as shipping is concerned, and have been instrumental in building up large transportation companies on the Great Lakes that are now engaged in moving copper to Detroit and other lake ports, and on the return trips take cargoes of coal to the upper lake ports for further shipment to the Northwest. Thus it is seen that Detroit's brass and copper industries are closely associated with the mines in the Upper Peninsula of Michigan, notwithstanding the fact that they use large quantities of crude copper that is mined in other parts of the country.

EARLY MANUFACTURING.

While copper and brass were early manufactured in Detroit, it was not until about thirty years ago that the brass business was developed to any great extent. The pioneer establishment in this line is the Detroit Copper & Brass Rolling Mills which are located on Clark avenue near Fort street. This institution is without question the largest of the kind in the West and has a reputation that is known throughout the United States, Canada, Mexico and even the foreign countries. This plant was the first to begin the manufacture of brass and copper into sheets, rods, wire and tubes. It was founded by Christian Buhl and Oliver Goldsmith, Rufus Gillett and a few other Detroit business men about thirty years ago. It was an unimportant concern at that time but, under the direction and management of Lewis H. Jones, the present president and general manager, the corporation has developed into an institution that now has a yearly output of 40,000,000 pounds. The material for this great tonnage is secured from the mines on Lake Superior and also from many of the Western copper producing States. In the pioneer days this plant gave employment to only about one hundred men and then was located in a small building located on Larned street. As the business of this institution increased it was found necessary to seek larger quarters, and the great plant on Clark avenue was built twenty years ago. The management at first devoted its time to the manufacture of sheet brass. As the demand for manufactured brass products became more insistent, the corporation decided to engage in the production of brass wire, rods and brazed tubing. This was back in 1902. Then in 1907 one of the most complete copper wire mills in the country was put in operation. This institution began to forge ahead after that and a history of this plant is practically a history of the brass industry of Detroit.

As an illustration of the great growth of the brass industry in Detroit it may be well to state at this time that the capital stock of the Detroit Copper & Brass Rolling Mills two years ago was $1,000,000. The following year it was increased five hundred thousand dollars. During the early part of the present year the corporation was reincorporated for $2,000,000. This corporation now furnishes great quantities of brass and copper for such well-known establishments as the Michigan Lubricator Company, Detroit Lubricator Company, Detroit

Brass Works, Penberthy Injector Company, Clayton & Lambert Manufacturing Company, the Sanitary Manufacturing Company; in fact every brass manufacturing concern in the city secures supplies from the Detroit Copper & Brass Rolling Mills, which of course also includes the automobile establishments. This great plant is constantly increasing its capacity in orders to meet the heavy demands of the trade. The latest improvement is the installation of a new turbine that is expected to vastly increase its power.

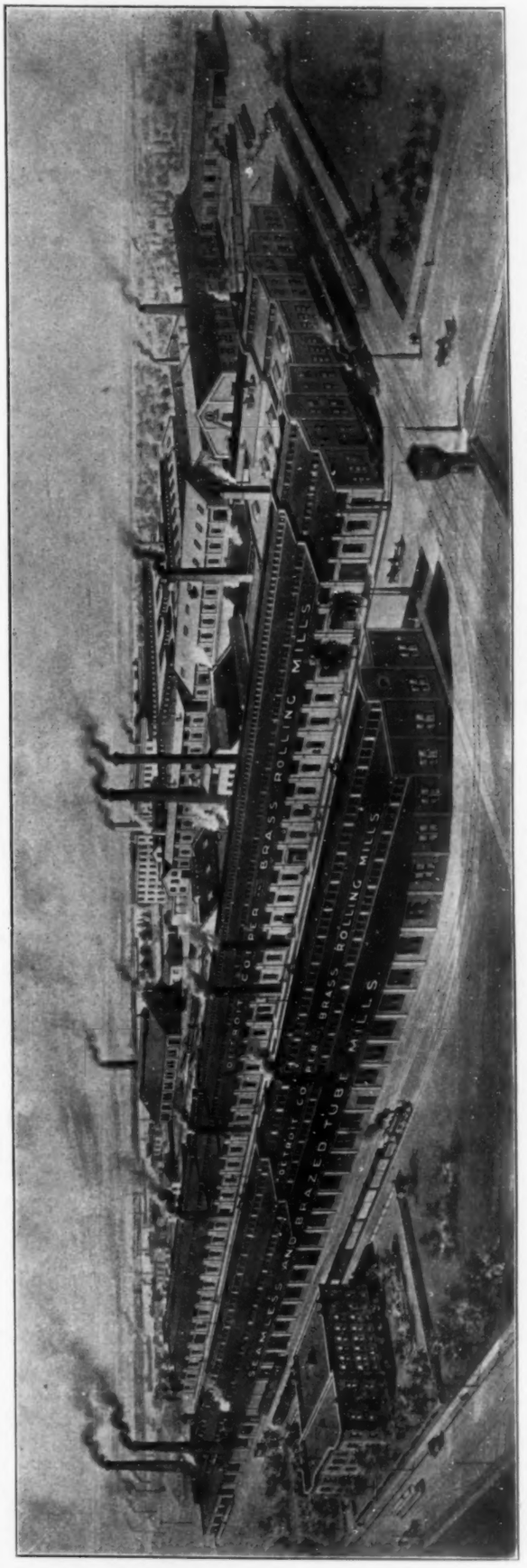
Another Detroit concern that has had wonderful growth is the Michigan Copper & Brass Company. This company was organized in 1906 and the mill started in operation in 1907, making a record for the installation of so large a plant. The production of this concern is copper and brass of every description, as sheet, rod, wire and tube, and in the short time of its industrial life has made itself felt as a factor in the business. With its new and up-to-date equipment a brilliant future for it is predicted. A full and illustrated description of this plant was published in THE METAL INDUSTRY, October, 1908.

A PROMINENT FACTOR.

It is generally conceded that one of the most prominent factors in the development of the brass industry in Detroit today is Mr. S. Olan Johnson, who stands at the head of the Penberthy Injector Company. Mr. Johnson began his career in the injector business way back in 1887, after he had made a notable success in other fields. The original Penberthy injectors failed to meet all that was required and at the time Mr. Johnson became interested in the concern only 175 had been manufactured. These were all called in and thrown into the furnace for recasting. Then began a period of experiment and new patents were secured, until now the present Penberthy injector is the finest contrivance of the kind being placed on the market. The business has constantly been enlarged from a plant that occupied a room of twenty by forty feet to one covering over an acre of space and giving employment to about 200 men. The Penberthy injector is now known all over the globe and is the result of an expenditure of $350,000 in advertising. As an illustration of the progress of this thriving concern, the management states that there are nearly 600,000 on the market, which is believed to be twice as many as has been produced by any similar manufacturing concern in this country or abroad. Mr. Johnson, the present head of the concern, owns more than a four-fifths interest in the business and he is the president and treasurer. He is an Eastern man and was born in Westfield, Mass., in 1847. His early life was spent in and around New York until failing health sent him to Colorado. After a residence there for seven years he came to Detroit and engaged in the injector business, becoming interested in the Penberthy concern. His son, Homer S. Johnson, is general manager and through his able administration has assisted his father largely in building up the business.

GROWTH OF A DECADE.

During the past ten years the brass industry in Detroit has experienced a remarkable growth. Previous to that time, although the city was a brass center naturally as a result of its location, the industry was undergoing a comparatively slow growth. New factories were gradually established and old ones branched out, but a real boom in the business did not strike the city in this line until the beginning of the automobile industry, about twelve years ago. The manufacturers before that time, however, were thorough men and skilful managers who sought every device and the most skilled mechanics in



THE ENTIRE PLANT OF THE DETROIT COPPER AND BRASS ROLLING MILLS, DETROIT, MICH., U. S. A.

the production of their goods. It was comparatively easy for them to secure the best copper from the mines of northern Michigan. The transportation of the new product was reasonable, far below the rates that could be secured by any other city. The favorable traffic rates were due to the lake route, over which the raw copper was almost exclusively shipped to the lower ports. The freighters found a most profitable business carrying up coal and returning with their hulls full of copper. This was especially profitable in the early spring and summer before the grain season opened. It will be seen, therefore, that Detroit is a favored city in regard to copper and brass. This is not the only feature that has assisted in building up the industry here. There is probably no other city in the country that has better rail shipping facilities to every part of the continent. The city is blessed with many trunk lines of railroads, which make it extremely convenient to ship out manufactured products. Added to this there is ample room for expansion. Detroit is situated on a great prairie. A person standing on top of a twenty-story building in the downtown section can see in every direction nothing but level ground and wide expanses of lake and river. As a result of this level condition the brass manufacturers and concerns engaged in other lines have no difficulty in securing factory sites. The brass factories of Detroit are scattered for miles in every direction, extending into the suburbs on every side of the city. This makes expansion convenient which, in connection with the automobile concerns, is absolutely necessary.

MOVING AWAY FROM THE CENTER.

The majority of the older brass manufacturing establishments in the old days located their plants in the center of the city where they would be convenient to the general public, but as the city began to grow the owners have found it necessary to seek the open fields far from the center of trade, where it is possible to expand and to erect modern plants.

This applies to the Penberthy Injector Company, the Detroit Copper & Brass Rolling Mills, the Clayton & Lambert Company, the Detroit Brass Works, the American Brass & Iron Company, the Art Brass & Wire Works, the Detroit Bath Tub & Brass Manufacturing Company, the Detroit Injector & Brass Manufacturing Company, the Detroit Lubricator Company, the Great Western Smelting & Refining Company, the Michigan Smelting & Refining Company, and the Allyne Brass Foundry Company. This latter corporation has just completed one of the most modern brass foundries in the world where two to three thousand men will be employed. A description of this great plant appeared in the April number of THE METAL INDUSTRY. The history and development of the brass industry in Detroit is also closely centered about this institution. Five years ago this plant was simply one of the ordinary substantial brass concerns of the city. It was experiencing a steady normal growth, but with the progress of the automobile industry it began the manufacture of brass and aluminum parts, and before the management hardly realized conditions, it was almost swamped with orders. Less than a year ago a consolidation was effected with the Aluminum Castings Company of Cleveland, the Eclipse Foundry Company of Detroit, the Syracuse Aluminum & Bronze Company of Syracuse, N. Y., and the United States Aluminum Company of New Kensington, Pa. This consolidated brass concern manufactures seventy-five per cent. of the aluminum castings used on automobiles in this country. So great is the demand that it is impossible to keep up with the orders.

THE AUTOMOBILE INDUSTRY.

The automobile industry has given a great boom to every brass manufacturing establishment in Detroit and the surrounding suburbs. There is hardly a brass plant in the city that is not more or less engaged in the manufacture of automobile parts, the older ones being engaged in the business for the past ten years. So vigorous has been the demand for these products that many new firms have been organized to engage exclusively in this work.

One of the latest concerns to take up this work is the Murphy-Potter Company, which is at present completing a plant near the Murphy Chair Company on Russell street. This new concern is under the supervision of Vice-President Henry Potter, one of the most skilled brass bearing manufacturers in the country. He was formerly with the Cadillac Motor Car Company, but left that corporation to engage in business for himself. In the manufacture of automobile bearings it has been the custom of many producers to turn out rough work. In fact the assemblying factories often find it necessary to dress over these parts, all of which costs money and takes time. Mr. Potter is a stickler for accuracy, and after interviewing many automobile manufacturers in the city, was informed that they would be willing to pay more for an accurate brass bearing than for one that was carelessly made. Then Mr. Potter decided to establish a factory where he could produce a bearing that was absolutely correct and would need no trimming after it reached the assemblying factory.

This new factory apparently has great promise and no doubt is the beginning of a great change in the manufacture of brass automobile bearings. Other factories must raise their standard to compete with the Murphy-Potter Company. Manufacturers throughout the city believe as a result that in the near future much better workmanship will be noted in the production of automobiles.

The progress of the Clayton & Lambert Manufacturing Company is an illustration of how some of the automobile factories came to start in Detroit. This is one of the most prominent brass factories in the city. A specialty is made of brass torches, gasoline burners for every purpose and gasoline firepots. A few years ago Fred W. Haynes came to the Clayton & Lambert Manufacturing Company and displayed the drawings for a magnificent motor car that had every indication of being a great success. Mr. Haynes wished to place some of his cars on the market and the Clayton & Lambert management, after considering the proposition, arranged to manufacture the cars. This was the advent of the celebrated Regal car that has met with such success throughout the country. It is a moderate priced vehicle, but built on lines to stand heavy work. Its durability was recognized at once and so great has become the demand that the Clayton & Lambert Company is unable to produce them fast enough, although the plant has been greatly enlarged within the past two years. A few months ago a whole square opposite the present plant on Pequette avenue was purchased and the erection of a big automobile plant has been started.

The Regal Automobile Company, when this plant is completed, will move from the Clayton & Lambert factory and hopes to be able for a time to fill, without difficulty, its rapidly increasing orders. The Clayton & Lambert factory, however, will continue as heretofore to produce its regular brass products. It is well to mention that the officers of this concern are closely identified with the Regal plant, both financially and in an executive capacity.

As a result of the automobile business Detroit has

doubled its population during the past decade. Few people can realize the great progress that has been made unless a visit is made to the city. The Packard plant on the East Grand Boulevard is now employing about five thousand men and turning out an enormous number of cars that are being shipped to all parts of the world. This corporation probably uses as much brass and aluminum as any other of the kind in the world. Following closely on the Packard comes the Buick, Cadillac, Hudson, E. M. F. Company, Hupp Motor Car Company, Brush Company, Chalmers-Detroit Motor Car Company, Grabowsky Power Wagon Company, Gray Motor Company, Scripps Motor Company and many others who are rapidly growing in importance.

These big concerns are keeping the brass manufacturers working at a high pitch, and while in other places the brass industry may not have been brisk at all times, here every factory has long been struggling to keep up with orders.

There seems to be no let up in the automobile industry, and as a result Detroit bids fair soon to outstrip in population all other lake cities, Chicago, of course, excepted. Detroit's population is now close to 500,000 and some enthusiasts even predict that the present census will show a greater growth than that. Brass and automobiles are king in the City of the Straits, where everyone admits that "life is worth living."

The following are the brass, automobile and kindred manufacturing concerns in Detroit:

ALUMINUM CASTINGS COMPANY, Bellevue and Mack avenues, incorporated 1909; capital stock, $800,000. President, Edmund E. Allyne; vice-president, W. P. King; treasurer, F. C. Root; secretary, G. C. Ford; general manager, Charles B. Bohn.

AMERICAN BRASS FOUNDRY COMPANY, 3631 Holden avenue; incorporated 1880; capital stock, $15,000. President, J. J. Fezzy; vice-president, W. S. Thomas; secretary E. J. Fezzy; treasurer, J. R. Thomas.

AMERICAN BRASS AND IRON COMPANY, Trombley avenue and Crystal street; incorporated 1905; capital stock, $10,000. President, D. A. Fraser; vice-president, W. R. Chandler; secretary and treasurer, L. K. Douglass.

AMERICAN ELECTRIC HEATER COMPANY, Woodward avenue and Burrows street; incorporated 1904. President, B. H. Scranton; vice-president, Frank Kuhn; secretary, Robert Kuhn; treasurer, John Scudder.

AMERICAN INJECTOR COMPANY, Fourteenth avenue and Michigan Central railroad; incorporated 1886; capital stock, $20,000. President, John Trix; vice-president, Ralph Phelps, Jr.; secretary-treasurer, H. M. Keeler.

AMERICAN LUBRICATOR COMPANY, 93-95 Catherine street; incorporated 1901; capital stock, $50,000. President, David Blumethal; secretary and treasurer, W. M. Levyn.

AMERICAN TYPE FOUNDRY COMPANY, 39 Congress street, West; incorporated 1902; capital stock, $6,000,000. President, R. W. Nelson; secretary and treasurer, John T. Murphy.

AUTO ACCESSORY MANUFACTURING COMPANY, Congress and First street; incorporated 1905; capital, $50,000. President, W. E. Metzger; secretary and treasurer, L. A. Howard.

AUTO CRANK SHAFT COMPANY, 192 Piquette avenue. President, R. M. Brownson.

AUTO MARINE APPLIANCE COMPANY, Atwater street; incorporated 1909; capital stock, $100,000. President, W. F. Stewart; vice-president, P. J. McCarthy; secretary and treasurer, Frank McNaughton.

BELLE ISLE MOTOR COMPANY, 45 Fort street, East; incorporated 1909; capital stock, $5,000. President, W. P. Gregory; vice-president, Robert W. Hamilton; secretary and treasurer, W. H. Waugh.

BRISCOE MANUFACTURING COMPANY, 1443 Woodward avenue; capital stock, $310,000. President, Frank Briscoe; vice-president, W. S. Conant; secretary, E. D. Moessner; treasurer, J. A. Briscoe.

BRUSH RUNABOUT COMPANY, Oakland avenue, near Connecticut; incorporated 1906; capital, $400,000. President, Frank Briscoe; vice-president, John A. Bogle; secretary, F. A. Harris; treasurer, E. D. Moessner.

BURROUGHS ADDING MACHINE COMPANY, Second and Amsterdam avenue; incorporated 1905; capital stock, $2,000,000. President, Joseph Boyer; vice-president, Henry Wood; secretary and treasurer, B. G. Chapman.

CADILLAC MOTOR COMPANY, 1343 Cass avenue; incorporated 1905; capital stock, $1,500,000. President, L. W. Brown; vice-president, C. A. Black; secretary, W. C. Leland; treasurer, W. H. Murphy; manager, H. M. Leland.

CAILLE BROS. COMPANY, Second avenue; capital stock, $300,000; President, Arthur Caille; vice-president, Adolph Caille; secretary and general manager, Edgar Elliott.

CAPITOL BRASS WORKS, Franklin and Chene street; incorporated 1908; capital, $200,000. President, Benjamin Noble; vice-president, A. E. Schrietter, secretary and treasurer, J. G. Dietz.

CARTER INTERNATIONAL AUTO MANUFACTURING COMPANY, 828 Ford building; incorporated 1907. Capital stock, $3,000,000. President, H. O. Carter; vice-president, F. J. DeTamble; secretary, F. J. McMurtrie; treasurer, M. R. Churchill.

CENTAUR MOTOR CAR COMPANY, 1009 Majestic building; incorporated 1907; capital stock, $25,000. President, J. B. Eccleston; secretary and treasurer, J. D. House.

CHALMERS-DETROIT COMPANY, Jefferson avenue and New Belt Line Railroad; incorporated 1906; capital stock, $300,000. President, Hugh Chalmers; vice-president, H. E. Coffin; second vice-president, J. J. Brady; secretary, F. O. Bezner; treasurer and general manager, R. D. Chapin.

CLAYTON & LAMBERT MANUFACTURING COMPANY, Trombley avenue and Beaubien street; incorporated 1901; capital stock, $200,000. President, N. J. Clayton; secretary, J. E. Lambert; treasurer, Bert Lambert.

DE LUXE MOTOR CAR COMPANY, Clarke and West Jefferson avenue; capital stock, $150,000. President, N. M. Kaufman; vice-president, S. R. Kaufman; secretary and treasurer, D. W. Kaufman.

DETROIT AUTO BRASS AND MACHINE COMPANY, 253 Willis avenue; incorporated 1908; capital, $10,000.

DETROIT BATH TUB AND BRASS MANUFACTURING COMPANY, 73 Baltimore avenue, West; incorporated 1907; capital, $50,000. President, J. T. May; vice-president, H. A. Coddle; secretary and treasurer, William May.

DETROIT FOUNDRY SUPPLY COMPANY, Ferry avenue and Dequinder street; incorporated 1905; capital stock, $25,000. President, E. J. Woodison; vice-president, W. B. Howard; secretary and treasurer, R. S. Ray.

DETROIT GAS AND ELECTRIC FIXTURE COMPANY, 68 Grand River avenue; incorporated 1907; capital stock, $10,000. President, W. A. Ryan; secretary, Thomas F. Burns; treasurer, C. A. Coppock.

DETROIT LUBRICATOR COMPANY, 1778 Trumbull avenue; incorporated 1906; capital stock, $1,000,000. President, Charles A. Hodges; vice-president, Clarence B. Hodges; secretary and treasurer, F. W. Hodges.

DETROIT SHIPBUILDING COMPANY (brass department), foot of Orleans street; incorporated 1909; capital stock, $1,428,000. President and treasurer, M. E. Farr; vice-president, P. H. McMillan; secretary, Ernest Ketcham.

DETROIT BRASS WORKS, Brooklyn and Michigan Central Railroad; incorporated 1903; capital, $250,000. President, W. A. Frazer; vice-president, A. W. Fussey; secretary and treasurer, E. J. Shaw.

DETROIT COPPER AND BRASS ROLLING MILLS, 91 Clark avenue; incorporated 1880; capital stock, $2,000,000. President L. H. Jones; vice-president, R. P. Joy; secretary-treasurer, W. F. Montgomery; assistant secretary, F. H. Hoffman.

DETROIT FAUCET COMPANY, 9 Congress street, East; incorporated 1909; capital stock, $50,000. President, Adolphe LaRiviere; vice-president, L. E. Allo; secretary and treasurer, C. A. Bryant.

HUPP MOTOR COMPANY, Jefferson avenue and Concord avenue; incorporated 1908; capital stock, $50,000. President, J. Walker Drake; vice-president, R. C. Hupp; secretary, John Baker; treasurer, Joseph R. Drake.

Ideal Manufacturing Company, 540 Franklin street; incorporated 1908; capital stock, $350,000. President, J. N. Wright; vice-president, J. W. Dyer; secretary, James P. Feely; treasurer, James W. Dyer.

Ideal Register and Metal Furniture Company, 1255 Military avenue; capital stock, $25,000. President, B. G. Radcliff; vice-president, E. E. Leggert; secretary and treasurer, F. A. Batchelder.

Michigan Copper and Brass Company, 1611 West Jefferson avenue; incorporated 1906; capital stock, $800,000. President, G. H. Barbour, Sr.; secretary and treasurer, G. H. Barbour, Jr.

Michigan Gas Mantle Company, 21 Atwater street; incorporated 1904; capital stock, $30,000. President, W. E. Brown; vice-president, C. F. Marschner; secretary and treasurer, Maurice Wolf.

Michigan Lubricator Company, 661 Beaubien street; incorporated 1883; capital stock, $200,000. President, J. B. Corless; vice-president, W. E. Bryant; secretary, R. H. Mitchell; treasurer, J. B. Corless, Jr.

Michigan Motor Castings Company, 2642 East Grand Boulevard; incorporated 1907; capital stock, $50,000. President, L. F. Bromley; vice-president, J. W. Thompson; secretary, A. H. Goss; treasurer, F. L. Bromley.

Michigan Smelting and Refining Company, 823 Superior street; incorporated 1903; capital stock, $40,000. Chairman, John Schroeder; vice-chairman, Joseph Silverstein; secretary, Jos. Sillman; treasurer, J. M. Schaefer.

Michigan Auto Parts Company, 1559 West Jefferson avenue; incorporated 1909; capital stock, $500,000. President, A. H. Green; vice-president, Edwin Verlinder; secretary, Wm. Hendrie; treasurer, Heatley Green.

Maxwell-Briscoe-McLeod Company, 243 Jefferson avenue; incorporated 1905; capital stock, $10,000. President, A. J. McLeod; vice-president and secretary, Robert K. Davis; treasurer, A. J. McLeod.

McRae & Roberts Company, 227 Cambell avenue; incorporated 1904; capital stock, $125,000. President, W. D. McRae; vice-president, M. A. McRae; secretary-treasurer, R. J. Service.

Modern Motor and Marine Company, 258 Jefferson avenue. President, George Basta; secretary and treasurer, F. T. Ternes.

National Motor Company, 224 Military avenue; incorporated 1908; capital stock, $14,000. President, D. J. Hughes; secretary and treasurer, F. E. Chandler.

Northern Motor and Manufacturing Company, Maybury Grand avenue and Grand Trunk Railroad; incorporated 1905; capital, $100,000. President, M. J. Brabb; vice-president, H. G. Field; secretary, A. F. Knobloch; treasurer, M. E. Farr.

Packard Motor Car Company, Concord and North Grand Boulevard; incorporated 1900. President, H. B. Joy; vice-president, R. A. Alger; secretary and treasurer, P. H. McMillan.

Penberthy Injector Company, 360 Holden avenue; capital stock, $50,000. President and treasurer, S. Olin Johnson; vice-president and secretary, H. S. Johnson.

Peninsular Brass Works, 678 Atwater street; incorporated 1907; capital stock, $10,000. President, Eli Brabant; vice-president, Milbone Guelette; secretary and treasurer, A. A. Henderson.

Regal Motor Car Company, Beaubien street and Trombley avenue; capital stock, $100,000. President, G. R. Lambert; vice-president, F. W. Hayes; secretary, J. E. Lambert; treasurer, Bert Lambert.

Roberts Brass Manufacturing Company, 1395 Fort street West; incorporated 1906; capital stock, $200,000. President, D. H. Roberts; vice-president, E. W. Roberts; secretary and treasurer, W. R. Roberts.

Superior Brass Company, 189 Larned street; incorporated 1909. President, T. B. Moore; vice-president, J. J. Walsh; secretary and treasurer, A. L. Kent.

Stephens-Roe Manufacturing Company, Clayton street and Martin road; incorporated 1884; capital stock, $250,000. President, C. W. Thomas; vice-president, C. H. Chandler; secretary, Palmer Stevens; treasurer, E. W. Thomas.

Sherwood Brass Works, 1167 Jefferson avenue; incorporated 1907; capital stock, $30,000. President, William Sherwood; vice-president, William C. Sherwood; secretary and treasurer, A. L. Walten.

Standard Brass Works, 528 Woodbridge street; incorporated 1899; capital, $30,000. President, F. G. Austin; vice-president, W. A. Moran; secretary and treasurer, A. F. Blesch.

Stevens, Frederic B., manufacturer of foundry facings and supplies, also platers' and polishers' supplies. Located at Larned and Third streets.

Thiery & Kendrick Manufacturing Company, 660 Franklin street. Manager, John Thiery; secretary and treasurer, Horace Kendrick.

Wolverine Foundry Company, 936 Bellevue avenue; incorporated 1907; capital stock, $10,000. President, Thomas Boehmke; vice-president, Albert Goodrich; secretary, R. B. Johnson; treasurer, Joseph Schefger.

Regarding the following firms we are unable to give any more than name and location at this time.

Art Brass and Iron Works, Forest and Ellery streets.

American Sanitary Manufacturing Company, 1067 Palmer avenue, East.

J. E. Bolles Iron and Wire Works, 44 Porter street

J. F. Baish, 101 Bates street.

Cope Pattern Works, 30 Brush street.

Diamond Manufacturing Company, Summit street and West Jefferson avenue.

C. C. Duel, 75 Jones street.

Essex G. B. Brass Company, 74 Fort street, East.

Frio Manufacturing Company, 1206 Bellevue avenue.

Globe Brass Works, 13 McComb street.

Grebert & Purdie, 12 Sherman street.

Hardoin Brass Company, 130 Larned street.

Home Brass Foundry, 215 St. Antoine street.

Hackett Brothers, 236 Lillibridge street.

Wm. Inglis Wire and Iron Works, 59 Woodbridge street.

F. G. Johnson, 56 Second avenue.

Kennedy & Grey Company, 209 Second avenue.

Michigan Metal Spring and Manufacturing Company, 29 St. Aubin avenue.

McCord Manufacturing Company, 2637 Grand Boulevard.

National Fulton Brass Manufacturing Company, 22 Brush street.

Ornamental Brass and Iron Works, 146 Sherman street.

Sterling Skinner Manufacturing Company, East Grand Boulevard and Russell street.

W. J. Scully Ventilator and Manufacturing Company, 171 Beecher street.

Smith Chandelier Company, 2665 East Grand Boulevard.

Adolph Walz, 278 Division street.

COPPER IN ASIATIC TURKEY.

United States Consul Wm. W. Masterson, of Harput, reports regarding copper in his district. He says that there is an extensive deposit of copper ore halfway between Diarbekir and Harput, at a place called Arghana Maden, that is being worked to some extent. There are really six copper mines at this place, though only three are now worked, one belonging to private individuals and two to the government, but the entire output of the mines is taken by the government at a fixed valuation. There is a smelter located near the mines and the smelting is done by wood fuel, a very expensive and scarce commodity in this country. What particularly attracted his attention to the fuel used in smelting was that within a few feet of the smelter rushes the western branch of the Tigris River, a mountain torrent with a tremendous fall, that half a mile farther up the gorge might be led off into a flume and brought to the smelter, thus developing enough electrical energy to smelt all the copper in that region, the only expense being the original cost of the flume and its upkeep, while the wood fuel at present used is worth almost as much as the copper smelted.

FLUXES AND FLUXES FROM THE STANDPOINT OF A BRASS FOUNDRY SUPERINTENDENT.

SOME REFLECTIONS REGARDING THE MERITS AND DEMERITS OF FLUXES IN GENERAL.

BY W. H. PARRY.*

W. H. PARRY.

Did you ever have the cock-sure flux salesman drop into your place with his usual song and dance about having something new in his line? It is safe to assume that this experience has happened to about everybody unfortunate enough to be founders of brasses and bronzes.

The virtues claimed for the many metal scavangers now being exploited by these scrupulously dishonest and unscrupulously honest salesmen are many and varied, and a recital of one man's experience with these good doers may perhaps induce many readers of THE METAL INDUSTRY into practicing the trying and crying necessity of booting at least some of this tribe of sharks from their offices.

That there are reputable and honest peddlers of foundry fluxes, of course, cannot be gainsaid, in fact it is a safe bet that ninety-nine out of every hundred are so afflicted, and our quarrel is not with them, but is with the smooth guy who slips one over on you without half trying and puts you in that condition closely allied to "wailing and gnashing of teeth" after you have tried his dope.

There is at present on the market a flux which, if used as per specifications, is a pure panacea for all the ills that brass castings are heir to, and as the price is fairly low, many have been induced to squander their little old thirty cents for a couple of pounds of this stuff with the assurance that their casting troubles are about to disappear, while the only thing that happens is the disappearance of the flux. The castings being only about as they always were and the user is out as many pennies as pounds he has bought multiplied by fifteen. When we consider that the bulk of this material is composed of the black oxide of manganese with some metal chips sprinkled through it. there ought to be the modest profit of about two hundred per cent. for the peddlers of this material; through that were modesty personified as compared with another wonderful compound which we will call "Punky Flux." An analysis of this material shows over three per cent. of aluminum and they unblushingly ask sixty cents a pound for this cure—all which comes in the form of foundry spillings covered over with some gray wash to give it the necessary mystic appearance so that the E Z (easy) marks will think that they are getting something for their money, and we might add that they do, as every pound means an outlay of a few cents while the profit is over one thousand per cent.

There is still another flux which the handlers are careful to remind prospective buyers contains eight separate and distinct ingredients, though its value as a flux is not proportionately as great as the number of ingredients would indicate except in inverse ratio. The rawest fake of all is the flux that is exploited as strictly mineral, and by strictly mineral we mean that some gravel pit or bank has been denuded of sufficient bird gravel of variegated colors to lend color to their claim that with the help of this material it is possible to make sound castings directly from buffings. If you don't believe it, why, just try it, and take my word for it you will never buy another pound and if you should happen to meet the salesman that "stung" you for this stuff, it is dollars to doughnuts that you would feel like handing him a wallop.

There is one thing that the sellers of fluxes do not seem to understand, and by sellers we mean both good and bad sellers of sells, and that is, that the use of any flux means a loss of time in the foundry. If one would follow directions as per their printed matter it means that there would be several less heats a day poured as the question of output does not seem to have entered their minds judging by the rules as laid down by these most eminent authorities. For instance, we are told to mix one and a half ounces of flux to every hundred pounds of metal so that in the event of any large melt of say six hundred pounds you are to place the stuff in alternate layers. Now see the trouble it makes for the melter in weighing out all of these portions, and after all what does it amount to? Well to tell you the truth, it remind me of an old story of a man who was once asked to define the word "nothing," and after scratching his head for a while decided that the nearest thing he could think of was a stocking minus the upper part and the foot part missing, and that is exactly what the most of the fluxes now on the market amount to.

*Superintendent National Meter Company, Brooklyn, N. Y.

FLUXES FROM THE VIEWPOINT OF THE METALLURGIST.

BY L. J. KROM.

DEFINITION AND DESCRIPTION OF A FLUX.

A flux, according to the best definition, is a material employed to promote the fusibility of a metal. A body that is infusible in itself may be employed as a flux to render another infusible body fusible. As, for instance, silica, and the silicates of lime and alumina are practically infusible when alone, but the addition of lime or oxide of lime, or an alkali to silicate of alumina causes the formaton of a fusible double silicate. Fluxes may act as true solvents and probably in many slags true solution occurs. More generally a flux is used for the purpose of forming a fusible compound with the earthy constituents of an ore, or to take up impurities from metals after oxidation.†

Fluxes are to be distinguished from the compounds which are used to produce some definite purpose with regard to the natural properties of a metal or alloy of metals. A compound used for this latter purpose is not a true flux, though a combination of a flux and a deoxidizer may be made and used with considerable

†Hiorns Practical Metallurgy.

degree of success; as binoxide of manganese may be mixed with borax or fluorspar and can be termed a compound flux. However, the deoxidizer compounds such as manganese, silicon, phosphorus, etc., are as a rule used by themselves and AFTER the application of the flux, which may be any one or a combination of a number of substances as borax, fluorspar, lime, cyanide of potassium, sodium bicarbonate, etc.

CHARACTER OF FLUXES.

Fluxes may be of acid or basic character and considerable intelligence is required in the selection of the proper flux to use, in order to choose the one which will give the best results under all conditions.

The prime object of a flux as used in the brass business today, whether in the sand casting or the wrought brass shop, is not only to promote fusibility, but also to cleanse the metal from impurities which may become entangled in its pores. Where the metal that is desired to be purified is mixed with considerable dirt and dross, as wash house products, grindings, etc., a flux of an acid character is best adapted for use, such as borax or fluorspar tempered with lime. On the other hand when the metal is easily fusible and all that is necessary is to protect it from volatilization or oxidation, some organic substance such as tallow, resin or even common salt is best, these substances, however, are better adapted for comparatively low melting point metals. For the higher melting point metals as copper, nickel and their alloys, there is no better protective covering than that afforded by charcoal.

VARIETIES OF FLUXES.

The fluxing compounds in general use are considerable in number and differ widely in character. Perhaps the one in most common use for the preparation of the ordinary alloys of copper and zinc is common salt or chloride of sodium. It melts and volatilizes at a red heat and is a very useful compound to use to prevent over-oxidation of the zinc in molten brass. When mixed with silica and heated to a red heat it forms a readily fusible silicate which then floats on the top of the metal and can be easly skimmed off when it is desired to pour the metal. It is a good compound to use for alloys rich in copper as some of the bronzes, etc. When used alone on pure copper it will form chloride of copper, which is volatile and quickly disappears owing to the high temperature. On zinc it seems to exercise the same influence as on copper, forming zinc chloride, which remains on the surface of the metal and serves to protect it from oxidation and subsequent volatilization.

SAL AMMONIAC.

Chloride of ammonia or sal ammoniac is an excellent compound for fluxing under certain conditions. It seems to be particularly well adapted for zinc and aluminum. When added to these metals when molten it melts and reacts with the oxides of the metals and forms either chloride of zinc or aluminum as the case may be. Ammonia is given off as a gas together with some of the chloride itself, which is not entirely taken up, giving rise to a strong smell of ammonia and a dense smoke, which constitutes quite an objection to its use in a foundry where ventilation is poor, but the results are good. In fact it is safe to say that sal ammoniac is the best flux to use on zinc when melted alone.

CHLORIDE OF ZINC.

Zinc chloride used in its commercial form as now found on the market ready prepared for use by the firms producing it has proved to be most successful as a flux for pure aluminum and its alloys. As this material has no corrosive action on the crucible, in which the metal is melted, it can be recommended when used in connection with charcoal. The action of the zinc chloride on aluminum and its alloys does not seem to be thoroughly understood, but it is probable that the flux itself is broken up and that some aluminum chloride is formed, which is volatile in small quantities, while the remaining compound is zinc oxide which is removed with the charcoal by skimming; it is probable also that some zinc is reduced and enters the alloy.

BORAX.

Sodium biborate or borax is the salt formed by the action on metallic sodium by boric acid and is found in large deposits in its native condition. This material makes an excellent flux for the preparation of any alloys in which easily oxidizable metals are used and where the temperature is quite high. Borax dissolves metallic oxides, but does not have any action on sand or other silicious materials, so that it does not attack the crucible nearly so strongly as some other fluxes, such as fluorspar and the cyanides of potassium, and for this reason it is largely used, particularly in the manufacturing of such alloys as German silver, etc. However, as the temperature required is very high, a large quantity of borax must be used in order to have it endure and form a covering throughout the melting process. Borax when in its crystalline form contains nearly 50 per cent. water, and as it is sold by weight this makes the cost very high and a great many concerns hesitate to use it where they melt large quantities of nickel for the manufacture of German silver.

I have found that a mixture of 20 pounds of borax, mixed with 80 pounds of a mixture of fluorspar and lime, gives an entirely satisfactory flux for this purpose. The fluorspar and lime combination is made by slacking 60 pounds of lime with water and adding the fluorspar in the proportion of 40 pounds per hundred pounds of mixture made up. This mixture has a very beneficial effect in preventing oxidation of the nickel and gives a free flowing slag, which can be easily skimmed off the crucible.

FLUORSPAR.

Calcium fluoride or fluorspar used by itself, on nickel or German silver, melts to a thin glass and has a very strong action on the crucible forming a fusible double silicate of calcium and aluminum, and liberating the graphite which will enter the nickel but does not appear to affect the metal to its detriment.

Where it is desired to "flux off" a large amount of silicious material, such as will be found in washings or grindings, etc., it will be found perhaps advisable to omit the borax and use a half and half mixture of lime and fluorspar. The real composition of the flux, however, depends altogether on the material on hand to be treated, its quantity and quality combined make up a problem that must be solved on the ground and no hard and fast rules can be set down.

POTASSIUM CYANIDE.

Potassium cyanide, a salt which is not found in nature, but is manufactured, has a very large and slowly growing use as a flux. It can really be considered as the most ideal material that could be employed for this purpose, for it fuses with remarkable ease and readily reduces many metallic compounds, particularly when it is mixed with carbonate of soda.

For the purpose of producing sound castings of copper there is really no flux that could be employed better than cyanide of potassium, but as a matter of fact, cost in the first place is against it, and in the second its destructive action on the crucible is a serious drawback to its employment. When the cyanide comes in contact with the material of which the crucible is composed, the aluminum silicate in the clay combines most readily with the potassium of the cyanide and forms a fusible double silicate of potassium and aluminum, thus readily disintegrating the crucible.

In metallurgical operations where the cost of the flux is of no moment, cyanide may be advantageously employed as a flux for copper by using a ring made of a mixture of carborundum sand and silicate of soda (water glass). This ring is made so that it fits snugly inside the crucible and rests on the top of the bath of molten metal, then the flux is applied to the surface of the metal that is exposed inside the ring. In this way the full action of the cyanide is secured on the metal and no deteriorating influence is allowed to reach the wall of the crucible. I have successfully employed this method in melting copper in quantities of upwards of 1,000 pounds and have not experienced any difficulty in keeping the sides of the crucible free from corrosion. Of course the carborundum rings are attacked and wear out, but a considerable life may be assured to them if the ring itself is made with an iron ring for a core, and if quite substantial as to thickness. For smaller operations where cyanide is employed, a mixture of 60 pounds of cyanide to 40 pounds of carbonate of sodium makes an excellent flux on copper compounds, when the cost is no object.

One of the objections that has been raised against the use of potassium cyanide, outside of its excessive cost, is that it is quite a serious poison and that the gas which is given off from the surface of the metal when the cyanide is applied is also poisonous. While the above is perfectly true, there does not seem to be any reason why the handling of cyanide should be precluded in the casting shop, for thousands of pounds of it are used daily in plating establishments, where it is the base of a great many plating solutions, both for base and precious metal deposition. Regarding the question of poisonous fumes, as the cyanide is always added to the crucible while it is still in the fire, there is little or no danger of cyanogen fumes reaching the atmosphere, for this discharge is but momentary and the gases are invariably drawn up the flue, and by the time the crucible is drawn from the fire there is no further danger from the formation of cyanogen gas.

If the cyanide is kept in the original containers that it was shipped in and the smaller sized parcels are used so that there is a minimum amount of depreciation by deliquescence (as this substance absorbs water very readily from the atmosphere when exposed), and the workman handles the cyanide with a pair of tongs as he puts it in the crucible, there will be no danger to the flesh from contact with the cyanide. In the case of making a mixture of potassium cyanide and sodium carbonate, if the cyanide is rapidly ground to a powder and then mixed up in the required proportions in a mechanical mixer and preserved in large glass jars with screw tops and kept tightly corked when not in use, the troubles of handling will be greatly eliminated. If large quantities of this flux should be prepared at one time, it should be stored in tin or zinc-lined containers, provided with air-tight covers and care being taken to exclude the atmosphere as much as possible.

FERROCYANIDE OF POTASSIUM.

Another compound of potassium, which is quite extensively employed in the fluxing of copper and its compounds, is the ferrocyanide of potassium, known as yellow prussiate. This substance has practically the same effect on copper as the cyanide, except that it is likely to introduce some iron into the metal, especially if it is allowed to remain for any considerable length of time. If one is melting copper and using comparatively clean material and is careful to use plenty of charcoal during the melting process, then it will only be necessary to add a little ferrocyanide at practically the last minute before pouring, and in this case it can be advantageously employed, as it will not remain in contact with the metal but for a few moments and the traces of iron, which may thus be introduced, may be neglected. The ferrocyanide is distinguished from the ordinary cyanide as not poisonous, and this is one advantage which it possesses over the cyanide, together with the rather more important one that it is less expensive.

SODIUM CARBONATE.

Sodium carbonate, or washing soda, is a material which will make a better flux when used in connection with some other compound; and while it is a good agent for dissolving sand, etc., it has a strong action on the crucible, and should really be mixed with sand or lime when being used as a flux for treating any class of metal bearing material from which it is desired to reduce the metal. For this purpose, however, a mixture of lime and fluorspar are far better adapted.

MAGNESIUM SULPHATE.

Magnesium sulphate or plaster of paris is a flux which is generally used in a foundry or smelting plant where the recovering of metals from sweepings and all sorts of waste materials is carried on. The principal virtue of plaster of paris as a flux is that it gives up its sulphur when it is brought under the influence of heat. The sulphur that is liberated then unites with the iron that may be in the material and forms a matt or fusible sulphide, and in this way the plaster of paris performs a valuable slagging office; as the metal being reduced from the waste material, or gangue, settles to the bottom of the crucible, the iron and other impurities rising to the top in the form of a light slag. In addition to the above property, plaster of paris melts at a red heat and dissolves oxides and silica and is also a very cheap compound. It does not attack the crucible very strongly, but if a grade of metal of high purity is desired to be made by the use of it, it is almost impossible to do so, on account of the presence of sulphur as mentioned above. For this reason then plaster of paris is generally employed as a fluxing material only in the case of cheap castings, where the purity of the metal mixtures is not an important object.

SALTPETER.

Nitrate of potassium, niter or "saltpeter," which is found native, although being an oxidizing agent, is used quite extensively in the manufacture of German Silver. It attacks the crucible quite rapidly and oxidizes the carbon and in this way it prevents the carbon from entering into the nickel of the mixture, but only to a limited extent. Niter finds a better application in being used as flux in the purifying of gold and silver, as it oxidizes and carries off as a slag the impurities that it is desired to get rid of.

MISCELLANEOUS FLUXES AND MIXTURES.

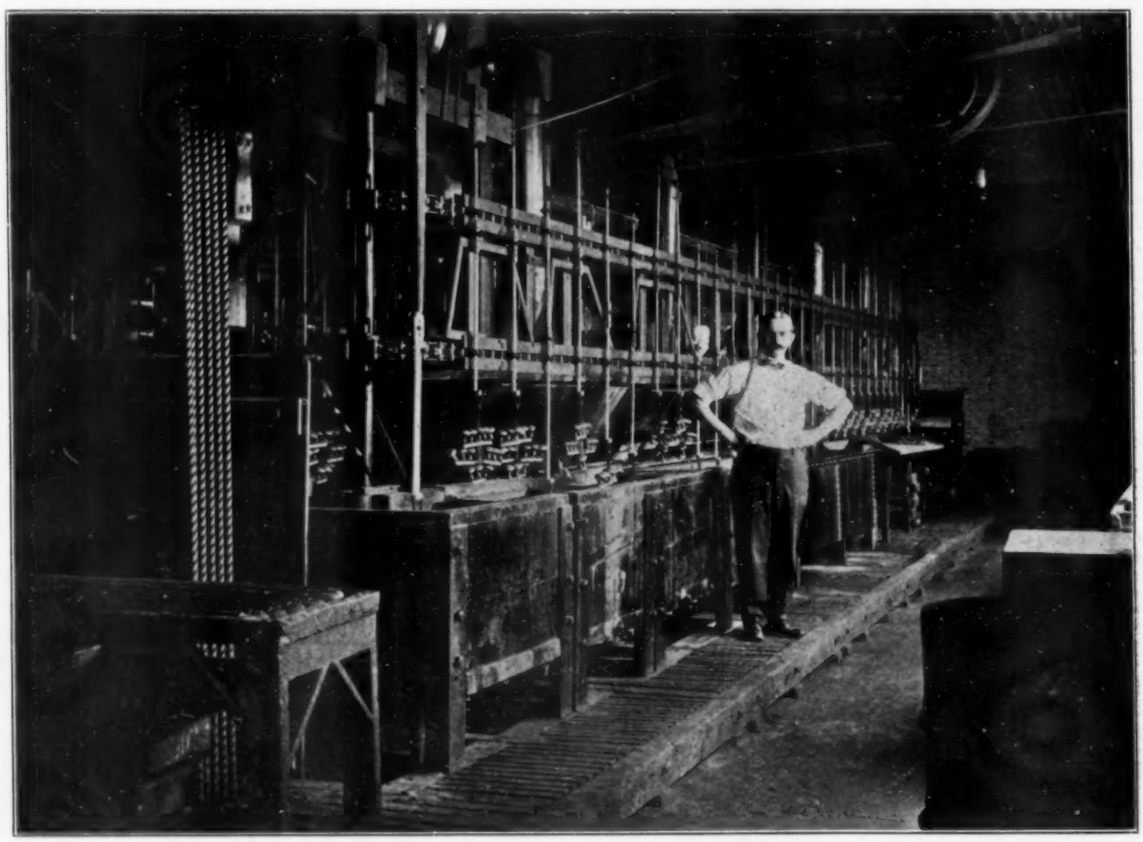
In addition to the fluxes mentioned in the foregoing there are a number of substances which are used with good results under certain conditions. A quite important one is glass and several other compounds which are grouped under the name of glass house waste. This material melts at a high temperature and is chiefly valuable for preserving the surface of a high melting point mixture from contamination by the furnace gases. I have used it with good success on occasions in making special mixtures of German silver and high copper bronzes. It has no action on the crucible and is used in connection with charcoal. Other substances sometimes used for fluxing are corrosive sublimate or bichloride of mercury and bisulphate of potassium, the latter of which is open to the same objection as plaster of paris. These compounds are expensive, however, and are not very generally used.

There are a number of fluxes on the market, some of secret (?) composition and others covered by patents, the specifications of which are so drawn as to really mask the real composition, and render it difficult to follow their direction with success. Some of these ready-made fluxes are of real merit while others, sad to say, are of the fake order in that they can be reproduced for a small fraction of their selling price. The base of these fluxes is one or more of the substances enumerated and there is no doubt that when they are honestly made and sold, that they do good work and are well worth their price. As I have said before the selection of the proper flux to use to fit certain metals and mixtures is largely a matter governed by the personal judgment and experience of the melter. Intelligently used with a full knowledge of the requirements and of the character of the materials used, there is no reason why better metal should not be made with a flux than without. In fact in the majority of cases a flux is absolutely necessary to success.

NOVEL AUTOMATIC PLATING MACHINE.

AN INGENIOUS DEVICE FOR THE ELECTROPLATING OF BUILDERS' HARDWARE AND OTHER ARTICLES IN LARGE QUANTITIES.

The machine shown in the accompanying illustration was designed and constructed by Charles J. Caley, until recently general manager of the Russell & Erwin Manufacturing Company, of New Britain, Conn., and now a director and manager of the Peterborough Manufacturing Company, of Peterborough, Canada. The Russell & Erwin Company are large manufacturers of all kinds of builders' hardware, such as locks, catches, sash trimmings, knobs, etc., and Mr. Caley, realizing the excessive cost in labor in handling



AUTOMATIC PLATING MACHINE IN PLANT OF RUSSELL AND ERWIN MANUFACTURING COMPANY, NEW BRITAIN, CONN. FOREMAN PLATER HUGH KELLY IN EVIDENCE.

vast amounts of this material in the various plating operations, set about to devise a means for cheapening the cost of production.

The machine here illustrated and described is the result of his labors. At the start he was somewhat criticised and ridiculed for his idea, but being a man of stubborn will and indomitable courage he persisted. The results obtained more than justified his perseverance and he deserves full credit for his conception. Referring to the cut, it will be seen that the machine consists of a framework built in the form of an oval. Grouped about this frame are the tanks containing the solutions incidental to the plating process. On the framework and close to the top of the tanks runs a metal track in the form of a flat narrow strip. This strip rises sharply to near the top of the frame when it comes to the end of a tank and dips again when over the next tank. At regular intervals on this track are placed flat metal strips terminating at one end in a hook on which is hung racks to hold the work. These metal strips are fastened to rollers which run on the track. The rollers are moved by a mechanism not shown in the cut.

OPERATION.

To operate this machine boys place the work upon racks at one end of the machine and hang the rack on a hook of the metal strip. The strip carries the work along to the edge of the first tank containing a cleaning solution. The strip runs down the incline of the track and the work is immersed in the solution. The strip then rises out at the other end by reason of the rise in the track and dips for the next tank. This process is carried on until the strip reaches the tank containing the plating solution. By this time the work is in a condition for plating and the length of the plating tank is so arranged with relation to the speed of the rack, that by the time the rack has traversed the length of the tank the articles are completely plated and no further operation is needed but to dry in sawdust and finish in whatever manner is required.

Electrical contact is made as soon as the work touches the solution by reason of the track being charged by the negative pole of a circuit. No undue amount of current is lost because the track is insulated from the body of the machine. There is absolutely no touching of the racks by human hands from the time it starts from one end of the frame until it reaches the other with its load of plated work. Boys are employed to load and unload the racks and are stationed at one end of the machine. The power required to operate it is very low, being only a part of a horse power.

OUTPUT.

The output of the machine is simply marvelous when viewed from the standpoint of the general practice. The work shown in the picture consists of steel door knobs which are plated in copper, brass or bronze and a day's work on this work used to be 2,000 for the ordinary force of several men when handled by hand. The machine turns out 2,450 knobs per hour and is tended by boys. Ordinary door locks, which are plated in the same way, are done at the rate of 1,800 per hour where 1,500 used to be considered a day's work! Other articles are done in the same proportion and the end is not in sight for the development of the idea.

METHOD OF CHANGING SOLUTION.

An exceedingly novel and yet simple method for changing the solutions used for plating in connection with this machine was devised by Mr. Caley. The solutions used continuously are copper, brass and bronze, all cyanide solutions. Three tanks of sufficient capacity were installed on the roof of a building in near proximity to the plating department. These tanks were connected with the plating tank of the machine by means of piping. When orders for, say, brass were predominating and copper had been used, a pump is started and all of the copper solution is pumped to the tank on the roof. The anodes are rinsed off and removed, brass anodes hung in, the valve of the tank on the roof containing the brass solution is opened and the plating tank is filled by gravity and is ready for use. It does not matter how often it is necessary to change from brass to bronze or copper, it can be done. The plating room may be plating brass today and change over to copper tomorrow with no other labor than to start a pump and change the anodes! Since the installation at the Russell & Erwin factory, the Yale & Towne Manufacturing Company, who are engaged in a similar line of manufacture at Stamford, Conn., have built one, and the P. & F. Corbin Company, of New Britain, are also building one.

NEW ELECTROPLATING PROCESS.

DEMONSTRATION IN ENGLAND OF A NEW SIMPLE HOUSEHOLD METHOD.

United States Consul-General John L. Griffiths, of London, describes a method recently devised by a resident of that city for replating various metal wares which promises to be of value in all households:

"Galvanit" is a granular powder for a new method of electroplating. Augustus Rosenberg, of London, the inventor, claims that the process is so simple, expeditious, inexpensive and effective that it is easily within the reach of every household. In a recent demonstration before the British Royal Society of Arts the inventor showed the many ways in which it may be applied. The powder is sprinkled on a moist cloth and rubbed on the surface to be plated, just as a metal polish would be applied. The desired result is obtained in a very few seconds. No preliminary cleaning of the surface is required, and no heat is necessary.

Worn electroplate can be renewed with a deposit of silver, dish covers and the insides of cooking utensils may be retinned, taps may be renickeled, and numerous articles in daily use may be recoated with their respective metals.

In the electrical industry the inventor claims that the process will simplify and minimize the work of soldering cable joints, because no preliminary scraping or cleaning of the wire is necessary. The life of zinc and copper process printing blocks may be indefinitely prolonged by periodical coatings of nickel that renders them impervious to the reddish inks which usually eat into the unprotected metal.

The galvanit powder is composed of three essential ingredients: (1) The metal to be deposited, either in pure or combined form; (2) a salt capable of producing an aqueous electrolyte when brought into contact with moisture; (3) a metal which is electropositive as regards the metal to be deposited. The combination may be used for depositing silver, tin, nickel or cadmium, on any metal surface except aluminum, and it is claimed that aluminum can be plated when the ingredients are in suitable proportions.

[United States Consul Charles N. Daniels, of Sheffield, also makes a report on the new electroplating process, which had been demonstrated there before an audience of 500, made up largely of practical men interested in the trade.]

PATENT CONTROVERSY OVER BEARING METALS

THE CONTINUATION OF AN INTERESTING DISCUSSION WHICH WAS STARTED A YEAR AGO BY THE READING OF A PAPER AT THE CINCINNATI CONVENTION OF THE FOUNDRYMEN'S ASSOCIATION, MAY, 1909.

BY G. H. CLAMER.*

The present discussion is the outgrowth of a paper which the writer prepared for the Foundrymen's Convention in May of last year, the title of this paper being "THE PATENT SITUATION IN THE UNITED STATES RESPECTING ALLOYS." In this paper a case bearing on the infringement of our alloy, known as PLASTIC BRONZE, was discussed in some detail. This was done because of this being the only patent case on alloys which, up to that time, had been before the courts. The final ruling of the Court of Appeals, third circuit, being that the change in the proportions of the constituents of an alloy, no matter how useful the result may be, did not entitle the originator to a monopoly of the patent. In other words, if this decision should stand, all patents covering simply the composition of alloys would be null and void, although hundreds of them have been issued by the Patent Office, many of them being of high merit. There are many instances of alloys in which a slight change in the proportions of its constituents have led to the most important results. For example, in the case of Hadfield's manganese steel. Sir Robert Hadfield found that, within a certain range of proportions a steel was produced with very remarkable qualities, i. e., extreme hardness and extreme toughness, whereas both below and above these proportions a steel of practically worthless properties resulted.

Without again presenting any of the details of this case, I wish merely to present the case as it now stands, i. e., the Circuit Court had found in the Plastic Bronze patent that it covered not only the product but the process, the process consisting in limiting the tin in proportion to copper so that a quick setting alloy is produced as a matrix to uphold lead in mechanical admixture. The patent office accepted this interpretation of the invention, and thereupon granted re-issued patent. Mr. Allan, in a discussion which appeared in the February number of THE METAL INDUSTRY, has attacked our claims by showing photomicrographs and photographs of journal bearings which were taken of copper-tin-lead compositions, outside the limits of our claims, i. e., tin and copper in proportion of over 9 per cent. tin to 91 per cent. copper, and over 20 per cent. lead. I am perfectly familiar with the fact that copper-lead and tin can be mixed in proportions as set forth by Mr. Allan, having covered this ground a number of years ago when studying copper-tin and lead compositions in every conceivable combination, so that the matter which he now presents, is not new to me at all. The alloys he describes can be made from pure metals without Allan's process, or any other process, in other words, by ordinary foundry practice. The high limit of tin in proportion to copper as covered by our patent claims, i. e., 9 per cent. tin to 91 per cent. copper, nevertheless is the safe working limit of alloys containing above 20 per cent. lead when small amounts of impurities are likewise present. This proportion of tin to copper is the theoretical limit for quick setting alloys. Furthermore, it is an undisputed fact that quick solidification is essential to hold up lead in such an alloy, but it would be ridiculous to suppose that the proportions as fixed by our patent must be rigidly adhered to to hold up exactly 20 per cent. of lead, i. e., that with tin 9 per cent and 91 per cent. copper in the matrix exactly 20 per cent. of lead could be maintained in the matrix, whereas, with tin 9.1 per cent. to copper 90.9 per cent., segregation would result. Our patent claims, it will be noted, call for more than 20 per cent. of lead, and it is quite natural to suppose that a small proportion of slow cooling matrix would not sufficiently effect the solidification of the whole matrix to cause segregation with lead a little above 20 per cent.

In my own experience, I have found that the limit for the amount of lead added with 10 per cent. of tin was somewhat above 20 per cent; with 8½ per cent. tin somewhat above 25 per cent., and with 9 per cent. of tin somewhat above 23 per cent. Mr. Allan, it will be noted, in the experiments which he has cited, has also with increased amount of lead decreased his amount of tin. I find that the presence of impurities greatly modify the results, and as in our patent we have stated that impurities in small amount might be present so as to come within practical working conditions, particularly on railroad work, where the return of scrap is included in contracts covering new bearings and thus necessitating the use of certain proportion of scrap, that the theoretical limit which we have fixed, i. e., 9 to 91 per cent., working under practical foundry conditions, i. e., with small percentage of impurities, is a safe limit for the production of such alloys. The photo-micrographs which are shown by Mr. Allan have no bearing whatever on the question of whether or not the lead segregates. It is perfectly possible to have an actual separation of pure lead at the bottom of the bearing, and still show a photomicrograph such as Mr. Allan has shown, taken from the centre of the brass. I do not say that bearings as made and exhibited by Mr. Allan in the February number of THE METAL INDUSTRY showed "lead sweat," as a matter of fact they should not, but I wish Mr. Allan would kindly show to the readers of your valuable paper bearings made in accordance with the mixtures mentioned in his discussion in the September, 1909, number of THE METAL INDUSTRY, i. e.,

Copper	Tin	Lead
58.00	10.00	32.00
63.00	9.50	27.50

exhibit the bearings at the office of THE METAL INDUSTRY and show photographs of journal bearings made from these mixtures. Should he be able to make such mixtures by means of the "Allan Process" I will freely grant that he is able to do something by means of his process which cannot be accomplished by ordinary foundry practice.

The introduction of tin into the "Allan" alloys is no doubt of quite recent origin, otherwise it is hard to reconcile the following statements made by him. The first one appears in the February number of THE METAL INDUSTRY and the second in his pamphlet on "Allan" metals, published before this controversy began.

1st.—"My entering this controversy has in no way been prompted by mercenary motives. My whole aim has been to establish my claim that Andrew Allan, Sr., is the inventor of alloying lead and copper in any pro-

*Second Vice-President and Secretary of Ajax Metal Company, Philadelphia, Pa.

portion with or without tin, and also to advance the knowledge of this art as a whole. The alloying of our products shall, as in the past, be governed by the needs of our trade, and will comprise lead and copper with or without tin in proportion as we deem advisable to meet any particular service conditions."

2nd.—"The difficulty encountered when trying to fuse together two metals of considerably different specific gravity is well known to metallurgists and foundry men. To fuse lead and copper into a homogeneous alloy has proven exceptionally difficult, and even today no process is known, except the "Allan process," by which these metals may be fused without the admixture of other metals, as tin, etc. Allan, however, had learned from experience that tin, nickel, or other metals added to the lead and copper mixtures was quite injurious to the anti-friction qualities of the lead, and without raising the melting point rendered the mixture hard and brittle; tin especially because of its adhesive qualities, he found to be a very undesirable element in bearing metal."

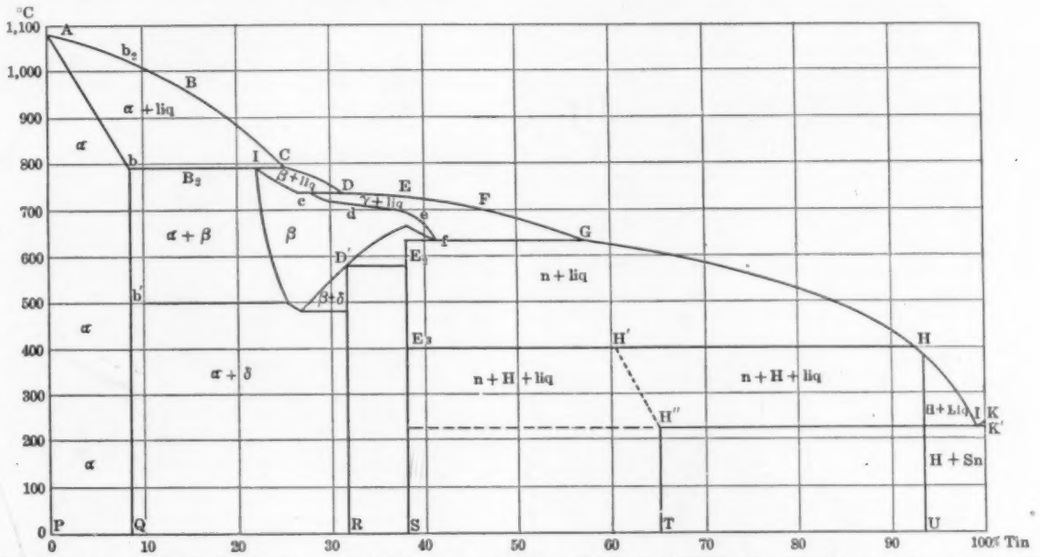


DIAGRAM OF MESSRS. HEYCOCK AND NEVILLE, SHOWING COOLING CURVE OF ALLOYS OF TIN AND COPPER.

A little further on in his pamphlet he makes the following statement:

"For different classes of service, compositions are made according to different formulae, but lead and copper only constitute these compounds and *they contain no tin at all.*"

The next point in the discussion is the freezing curve of the lead-copper alloys. In connection with my discussion in your November number, I published the complete freezing curve of the lead-copper series of alloys as determined by the Alloys Research Committee and published in their fourth report. This freezing point curve covers the whole series of copper-lead alloys between zero and 100 per cent., and is confirmed by the freezing point curve of a single alloy of the series, i. e., "Allan's" metal No. 1 as made by Messrs. Sauveur & Boylston, and published by Mr Allan in his February discussion, and confirms completely the statements which I have heretofore made, i. e., "Allan's" metal does not solidify at one constant temperature as claimed by him at 1500 degrees, and shows that the strength of "Allan's" metal is limited to temperatures under the solidifying point of the constituent melting at 340 degrees. The freezing point curve, as shown by the Alloys Research Committee, shows that as lead is added to copper, a lowering of the melting point takes place, until approximately 40 per cent. of lead is reached. After this the solidifying point of the copper constituent remains constant until the alloy contains approximately 80 per cent. of lead. The lead constituent in all alloys solidifies at the same temperature, with the exception of those in which the copper exists in but a very small proportion. Mr. Allan has evidently confused the curve of the Alloys Research Committee showing the whole series of copper-lead alloys with the curve prepared for him by Messrs. Sauveur & Boylston, showing the freezing point curve of but one alloy in this series, i. e., that of the composition of "Allan's" metal No. 1.

In regard to Mr. Allan's further interpretation of the equilibrium diagram of the series of copper and tin alloys by Haycock & Neville, I wish to quote the following which is from the testimony* of Dr. Albert Sauveur, of the firm of Sauveur & Boylston, who prepared this freezing point curve for Mr. Allan above referred to, and who is, as we both seem to agree, a man of high authority.

"A. As I understand the patents in suit the complainants have invented some new and useful alloys for anti-friction bearing. It is distinctly stated in their specification that such alloys should contain less than seven per cent. of tin, more than twenty per cent. of lead and the balance copper. By so doing they divide all tin-copper-lead alloys sharply into two classes, namely, (1) those containing less than seven per cent. tin, more than twenty per cent. lead and the balance copper, and (2) those whose composition does not fall within those specified limits. They claim that the first class of alloys, namely, those containing less than seven per cent. tin, more than twenty per cent. lead and the balance copper possess some anti-friction qualities which are not possessed by the second class of alloys.

"If we refer to the constitution of tin-copper-lead alloys as revealed by the microscope, by the study of their solidification and by other methods employed by scientists in the study of alloys, we find that their claim is fully confirmed.

"Messrs. C. T. Heycock and F. H. Neville, both fellows of the Royal Society and scientists of high standing and universal reputation, published in 1903, in the Philosophical Transactions of the Royal Society of London, an important thesis entitled: 'On the Constitution of the Copper-Tin Series of Alloys,' in which

*In the recent suit for infringement on Plastic Bronze.

they give the results of a very exhaustive investigation dealing with the constitution of copper-tin alloys. This masterly work has been accepted by all scientists interested in the subject as conclusive evidence of the true nature of copper-tin alloys and the accuracy of their conclusions has been verified by a number of workers in the same field. In the accompanying cut I have reproduced the diagram of Messrs. Heycock and Neville which shows in a graphical manner the constitution of alloys of tin and copper containing from zero to twenty per cent. of tin, as well as the mechanism of the solidification of these alloys.

"When alloys of copper, tin and lead solidify, the copper and tin unite and solidify first, forming, so to speak, a rigid skeleton which contains the still molten lead, which metal in turn solidifies at a considerable lower temperature. These alloys, after complete solidification, consist of a copper-tin matrix holding the lead in a purely mechanical manner. It is, of course, well known that the lead gives the necessary plasticity to the bearing, while the copper-tin matrix supplies the needed strength to carry the load.

"We may, therefore, consider all copper-tin-lead alloys as composed (1) of a copper-tin matrix; and (2) of mechanically held lead.

"In specifying an upper limit for the tin (seven per cent.) and a lower limit for the lead (twenty per cent.) the complainants fix in a no less rigid manner the composition of the copper-tin matrix. With seven per cent. tin, twenty per cent. lead and the balance (seventy-three per cent.) copper, it is evident that the copper-tin matrix will contain seven parts of tin to seventy-three parts of copper or in percentages, 9.6 per cent. tin and 90.4 per cent. copper.

"If we now turn to this diagram we shall see that 9 per cent. tin corresponds to a marked critical point in the constitution, and, therefore, in the physical properties of copper-tin alloys.

"The vertical ordinates represent the scale of temperatures expressed in degrees centigrade, traversed by the alloys as they pass from the liquid to the solid condition, and the horizontal ordinates represent the percentages of tin in the alloys. The curve A B indicates the temperatures at which the various alloys begin to solidify and the curve A C D the temperatures at which the solidification is completed.

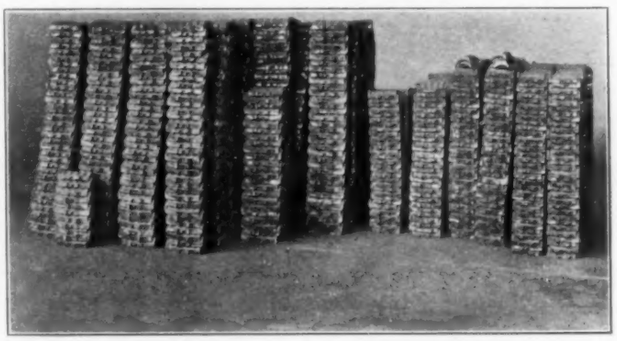
"By specifying an upper limit of 7 per cent. tin and a lower limit of 20 per cent. lead in the bearing alloys, the complainants specify for their alloys a copper-tin matrix whose composition will fall to the left of the line EF in the diagram, and it will be evident from a study of the diagram that a matrix of this character possesses characteristics which readily explain the superior qualities of the corresponding bearing alloys. It will be seen, moreover, that as we pass to the right of the line EF (that is, with more than 9 per cent. tin in the matrix), the properties of the matrix change not by degree but abruptly. In other words, that there is a marked critical point in the constitution and properties of these alloys corresponding to the limits indicated in the patent, namely, 7 per cent. tin, 20 per cent. lead and the balance (73 per cent.) copper.

"Taking the alloy with 7 per cent. tin and 20 per cent. lead, this means a copper-tin matrix containing a little over 9 per cent. tin. If we turn to the diagram we find that when such an alloy cools from the molten condition it begins to solidify when the point E is reached, which indicates a temperature of 1,020 deg. Cent., and that the solidification continues as the temperature falls from E to C, that is, from 1,020 degs. to 790 degs. At C the alloy has become entirely solid. The solidification period, therefore, for an alloy containing 9 per cent. of tin covers 230 deg. cent. If we now consider a copper-tin matrix containing less than 9 per cent. of tin, say 5 per cent. tin, we find that it begins to solidify when the point H. is reached, i. e., at 1,050 degs., and that the solidification continues as the alloy cools from H to H^1, i. e., from 1,050 to 925 deg. cent., the entire range of solidification covers only 125 deg. cent. It will be apparent, from the diagram, that as the tin decreases below nine per cent. (which means 7 per cent. in the alloys) the solidification begins at a steadily increasing temperature and that the solidification range decreases steadily, until pure copper is reached, when the metal solidifies entirely at the temperature of 1,080 deg. cent.

"Those bearing alloys, therefore, which according to the specifications of the patent contain less than 7 per cent. tin and more than 20 per cent. lead, have a copper-tin matrix which solidifies so quickley that they are able to retain a large proportion of lead. Moreover, as the tin is decreased below 7 per cent. the solidification of the matrix takes place at a correspondingly higher temperature, and is completed more quickly so that such alloys are able to retain a correspondingly greater amount of lead. This accounts in a very satisfactory manner for the large amounts of lead which can be retained in the complainants' alloys by decreasing the proportion of tin.

"If we now pass to the right of the line EF in the diagram, representing the cooling of alloys which fall outside the limits mentioned in the patents, we find an abrupt change in the constitution of these alloys and in the mechanism of the cooling. Taking for instance an alloy containing 15 per cent. tin. It begins to solidify when the point K (960 deg.) is reached and continues solidifying as the alloy cools from K to K^1 or from 960 to 790 deg. When K^1 is reached, however, over 40 per cent. of the alloy still remains liquid. By keeping it a sufficient length of time at 790 deg. the liquid portion will solidify, but this requires considerable time and gives an opportunity to the lead to separate out. It is why the alloys to the left of EF, i. e., outside the limits of the patent in suit, are not capable of retaining as much lead as those within the limits of that patent.

"It can be calculated that the solidification period of an alloy with 15 per cent. tin is roughly four times longer than with 5 per cent. tin, hence the much greater power of the latter alloy of retaining lead while solidifying by denying the necessary time for that metal to segregate.



A PILE OF BRONZE CAR BEARINGS.

"When alloys of copper and tin containing less than 9 per cent. of tin, solidify after the fashion I have just outlined they form what is known as a solid solution, meaning by that a solid whose component parts while not being chemically combined are so completely merged that they cannot be distinguished from each other either by the microscope or by any other physical means. In the case of glass, for instance, we have a very good example of a solid solution. Glass is made up of silica, lime and alkali, but these three components are so completely merged that they cannot be detected either through the microscope or through any other physical means. The particles of silica cannot be distinguished from those of lime, nor those of lime from those of alkali, the merging being complete. When bearing alloys, therefore, made in accordance with the specification of the patent in suit solidify they have a copper-tin matrix, in which the copper and tin are completely merged, forming a thoroughly homogeneous constituent known as a solid solution. The tin cannot, under the microscope, be distinguished from the copper.

"The mechanism of the cooling of these alloys which do not fall within the specifications of the patent in suit as well as their constitution are on the contrary, quite different. When alloys of this class begin to solidify a solid solution is formed, but when the temperature of 790 degs. cent. is reached those alloys are still partly liquid, and the molten portion now solidifies, forming a second solid solution differing from the first one from the fact that it contains a larger proportion of tin (some 22 per cent.). This second solid solution, however, is later on (at a temperature of 500 degs; line C^1 D^1 in my diagram) converted into a definite chemical compound $SnCu_4$, so that alloys of this class are finally composed after complete cooling of two distinct constituents, (1) a solid solution, and (2) a definite compound. It is clearly seen then that a critical change occurs in the constitution of copper-tin alloys when 9 per cent. of tin is reached.

"If we compare the physical properties of the copper-tin matrix of these two classes of alloys we will find that the first class of alloys, i. e., those alloys prepared according to the specification of the patent in suit have a matrix which is softer and more plastic than that of the second class because of the presence in the latter of the compound $SnCu_4$, which increases its hardness and decreases its plasticity. The structure of these two classes of alloys—namely, those containing only a solid solution and a chemical compound—are clearly shown in photomicrographs accompanying the paper of Messrs. Heycock and Neville, to which I have already alluded.

"To sum up the tin and lead limits specified in the patent in suit correspond to a marked critical point in the nature of the copper-tin matrix of alloys of copper, tin and lead, which critical point involves critical changes (1) in the mechanism of the solidification of the alloys, (2) in their power to retain lead, (3) in their structure and (4) in some of their physical properties.

"The above scientific considerations support, in a remarkable manner, the claims of the patent and account for the phenomena involved."

Mr. Allan makes the following statement:

"For over eighteen years we have commercially manufactured "Allan's metal" and I feel that I have quite a good idea of what can be accomplished in this art by ordinary foundry practice. I have come across many substitutes for "Allan's" No. 1 metal, but can conscientiously say that I have yet to see merchantable castings of 50 per cent. lead and 50 per cent. copper other than those produced by us. From my own experience, I can positively state that by ordinary foundry practice alloys of 50 per cent. lead and 50 per cent. copper cannot be produced without segregation or "lead sweat," and I have yet to see a strictly copper-lead-tin alloy containing over 25 per cent. lead, that will not exhibit "lead sweat," other than those alloys produced by our process."

Evidently Mr Allan's experience, although it has extended over a long period, has not been such that he has been in touch with what has been commercially made for the past ten years. I am sending herewith sample of an alloy containing 55 per cent. lead and 45 per cent. copper, and as for the commercial production of alloys containing over 25 per cent. of lead and containing tin, we are in a position to exhibit hundreds of analyses showing such alloys made commercially every day in our foundry, composition being copper, 65 per cent.; tin, 5 per cent., and lead, 30 per cent. These analyses not only being our own, but those of prominent railroad laboratories. Also quote the following taken from the testimony of Dr. Sauveur, who has made such alloys.

"Q. 7. Have you followed the description of the patent in suit practically and what result if any did you get?

"A. I have made to that effect a number of experiments at the works of the Ajax Metal Company, with the following results:

"Melt marked No. 1—300 pounds of metal, were melted in the following proportions and cast into bearings in the usual manner:

Tin	5 per cent.
Lead	30 per cent.
Copper	65 per cent.
	100 per cent.

"The resulting bearings were very sound and showed no indication whatever of lead segregation.

"Melt marked No. 3—300 pounds of metals, were melted in the following proportions and cast into bearings in the usual manner:

Tin	7 per cent.
Lead	20 per cent.
Copper	73 per cent.
	100 per cent.

"The resulting bearings were perfectly sound and there was no indication whatever of lead sweat. The proportions of the component metals used in these experiments are typical proportions as called for by the patent in suit."

I think this will refute Mr. Allan's statement which he makes in conclusion to his discussion, as follows:

"I wish to state that the successful application of this art to produce merchantable castings, that will not exhibit 'lead sweat,' cannot be accomplished by ordinary foundry practice."

So far as the technical points of this discussion are concerned, I fail absolutely to see that Mr. Allan has contradicted any of the points as brought forward by me. As a matter of fact, he confirms them all, but the point at issue, on which Mr. Allan started this discussion, was to prove that his father, Andrew Allan, Sr., actually invented the series of alloys to which plastic bronze belongs, because of the fact that he previously made copper and lead mixtures. I, personally, have already granted that Mr. Allan was probably the first to successfuly put on the market copper-lead alloys, and as for the little honor which is due for the discovery of plastic bronze series of alloys, this is a matter which is indeed of very little concern to our readers. I am quite well satisfied that the statements made by Mr. Allan in his discussion, which has appeared in this paper, also his circular covering Allan's metal, have not been made with any attempt at deception, but are entirely in accordance with his own understanding of the facts, which, however, as I have pointed out, are not scientifically correct.

CORRECTION.

On page 69 of the February issue of THE METAL INDUSTRY, Mr. Clamer is quoted in two places as stating that the Copper Constituent of Allan Metal No. 1 begins to solidify at 1100 degs. Cent. This is an error, the figure should be 1060 degs. Cent. in both cases.—A. Allan, Jr.

NICKELED WIRE DUTY LOWER.

APPRAISERS OVERRULE ASSESSMENT OF 45 PER CENT. AS LEVIED BY COLLECTOR.

The United States board of General Appraisers has handed down a decision regarding the classification of coated wire imported by Hermann Boker & Co., New York, favorable to the contention of the importers. The merchandise consists of wire composed of iron and nickel. It is produced by forcing an iron core into a nickel tube and then drawing the combined article down to the required sizes.

Duty was assessed at the rate of 45 per cent. under the provisions of paragraph 137, act of 1897, as iron or steel wire not specially provided for, whether covered or uncovered with metal. The importers' claim is that the wire should be allowed to enter under the same paragraph as assessed, but as iron or steel wire "coated" with metal at the rate provided for the wire from which the article is made with 2-10 of a cent per pound in addition.

United States General Appraiser Fischer, who writes the decision, says the classification of this wire, not coated with a nickel deposit by galvanizing, dipping or some similar method, but covered with an outer welded surface of nickel, turns upon the latitude taken in the final clause in paragraph 137. The General Appraiser reaches the conclusion that the interpretation to be given the final clause of the paragraph is of a character to warrant sustaining the contention of the importers for the imposition of the lower duty. The collector is ordered to make a reliquidation at the lower rates of duty.

THE MANUFACTURE OF HIGH COPPER CASTINGS.*

A Comparison in Methods of Melting—Oil vs. Gas.

By W. J. Reardon.†

W. J. REARDON.

The fact, based on my experience, that copper castings can be successfully cast from copper melted in an oil melting furnace, should convince the most skeptical foundryman as to the efficiency of the oil furnace when properly handled. In this connection I will give the results of a test made recently between two reliable manufacturers. I will not give the names here of these concerns, but any one interested may obtain them by writing to The Metal Industry. Both of these foundries are doing good work with the particular style of furnaces used, but owing to the reports that had been going around as to losses from oil furnaces, I presume the managements became each somewhat skeptical of the other's style of furnace. A test was arranged for which was to cover all possible points in the producing of good castings.

Foundry 1 used gas for fuel and Foundry 2 used fuel oil. A test committee of three was appointed by each company; one man representing each from the management, foundry and laboratory. The following outline was agreed upon to govern the test:

1. The furnace to be cold and clean, no metal hanging on sides or bottom.
2. Both gas and oil consumption to be measured from starting to closing down of furnaces after completion of test.
3. Composition of metal to be 219 parts copper, 54 parts zinc, 21¾ parts lead, 5¼ parts tin; 350 pounds of clean gates of the same composition. Total, 650 pounds per heat or charge.
4. All metal to be weighed in and out of furnace on the same scales.
5. All metal to be weighed before being put into furnace. All metal withdrawn from furnace also to be weighed, then skimmed clean and the skimmings to be saved until the end of test, after which they are to be weighed and deducted from the gross amount of metal drawn from furnace.

The skimmings are next to be melted in a clean crucible, and whatever metal recovered in so doing is then to be added to the net amount withdrawn from the furnaces.

The test was made with the following results:

FOUNDRY NO. 1—GAS FIRED FURNACE.

Amount of metal charged.....4,550 pounds
Amount of metal recovered.....4,427½ pounds

Loss in melting ..... 122½ pounds

Time of melting, 9 hours 54 minutes.
Amount of gas consumed, 6,523 cubic feet.
Value of gas consumed, 73 cents.
Percentage of lost metal, 2.69.
Average temperature of metal as measured by Hoskins pyrometer, temperature taken of the metal in ladle 2,000 degs. Fahr.

The melting time is from the starting to closing down of furnace. This includes the time for heating of furnace and pouring out of metal.

FOUNDRY NO. 2—OIL FIRED FURNACE.

Amount of metal charged...4,550 pounds
Amount of metal recovered..4,498½ pounds

Loss in melting ..... 51½ pounds
Time melting, 5 hours 52 minutes.
Amount of oil consumed, 108 gallons.
Value of oil consumed, $2.48.
Percentage of lost metal, 1.13.
Average temperature of metal as by Hoskins pyrometer, temperature taken of the metal in ladle, 2,175 degs. Fahr.

As a result of these tests it has been shown that Foundry 2's method of melting brass is the most economical and will show quite a saving both in time and cost over Foundry 1's method using gas as a fuel. Valuing the composition used on this test at 11½ cents per pound, and for a comparison take a ton of metal.

Cost of fuel, Foundry 1, per ton.....$0.33
Cost of fuel, Foundry 2, per ton..... 1.19

Excess cost of fuel, Foundry 2.....$0.76
Loss in melting, Foundry 1.....2.69 per cent.
Loss in melting, Foundry 2.....1.13 per cent.

Excess loss in melting, Foundry 1.....1.56 per cent.

This 1.56 per cent. of loss has a value in ton lots of $3.58. Taking the 76 cents excess cost of fuel that Foundry 2 has from the $3.58, Foundry 2 still shows a saving of $2.82 per ton of metal melted. This test also shows that there is a saving of 40 per cent. in time and floor space in melting with oil over gas.

True economy, however, is that which secures the best castings and gives most security in avoiding scrap, both in the foundry and machine shop. If some foundries have not been successful in handling oil melting furnaces and have gone back to crucible furnaces, the fault is not in the furnace, but lack of knowledge of how to operate it.

*Continuation of an article in The Metal Industry, January, 1910.
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TREASURY DECISIONS.

Zinc Oxide.—Protests 388503, etc., of Holland Enamel and Paint Company (New York).

Merchandise classified as colors under paragraph 58, tariff act of 1897, was claimed to be dutiable under paragraph 57, relating to oxide of zinc not containing lead. This contention was sustained.

United States General Appraiser McClelland in his report on the matter said: "The evidence seems to bear out the latter claim. The official chemist reports the merchandise to be a pigment mainly zinc oxide, containing a very small amount of lead, and when orally examined on said report the chemist states that in his opinion the lead found was not designedly introduced into the composition, but that it was either naturally present in the zinc or resulted from the use of a grinding machine that had previously been used in the grinding of lead paint.

"We therefore find that the traces of lead found were too insignificant to merit consideration; that the merchandise is zinc oxide not containing lead within the meaning of paragraph 57."

LATEST PRACTICE IN GRINDING AND POLISHING OF METALS.

A Description of the Various Kinds of Wheels Used for the Finishing Operations.

By M. C. Sullivan.

Outside of the rag wheel in the buffing and coloring of brass, copper, bronze and silver, improvements since I was a boy have, to my knowledge, been very small in an economical way. Improvements in grinding have mostly gained the benefit from the production of the raw material in drawn tubing and drawn bar metal. In the days when the metal was rolled, it needed quite a little grinding and sand polishing before the buffer could get anything like a good surface to call a first class finish. To write on this and explain it would take to much space.

M. C. SULLIVAN.

The writer, having worked among all classes of men in the polishing and grinding business, does not find the common sense and the mechanical skill as of 25 or 30 years ago. Since the canvas wheel and the felt wheel covered with emery came into use, admitting that the skill required is less on either of them, the expense for material does not pay for their use in a majority of cases where they are used on flat work. A felt wheel will burn and overheat the work just as soon as the keeness of the grit leaves it. A rag wheel will dig into any old hole that is in a casting, but when the work is finished a keen eye can easily detect the marks that it has left behind.

THE WOODEN WHEEL FOR GENERAL WORK.

In my mind there is no better method for grinding and polishing than by the old wood wheel covered with leather, which in reality should be white oak-tanned for grinding flat work, bullsneck for oval work, and walrus for all classes of inner round corners and edges. When the wheel is made right the hair side is glued next to the wood, drawn and clamped on in a wet state. On a wheel covered with walrus hide when finished, the leather will stand ⅝ or ¾ of an inch over the wood. Let the sides of the wood be dished into the hub so that the top edge will project out. This wheel when put into the hands of a reliable workman would surprise the majority of people by the work it would turn out. The work which is today turned and filed could be easily finished on the above wheel where it does not call for any special size or gauge and would not show any defect in the surface. A leather wheel to work on its edge for a very small inlet or groove to run as a bob is all right and gives first-class results, which is nothing new, but for sand polishing tubing, brass, silver, copper and bronze it does not give the same results as if the wheel was covered with the walrus leather, which would give an equal surface. When leather is worked on its edge the flesh side works soft with the hair side working hard, consequently by turning the wheel down there is actually 30 per cent. of the material going to waste.

In several classes of stamp work where the edges have to be polished they run the edges out with a buff, not taking into consideration the waste of material and composition, which is all a dead waste, and then when finished they do not have a decent job. If the work was taken over a leather covered wheel it could be made a first class job for one-quarter the cost, counting material and the labor which must always be considered.

REASONS FOR DEFECTIVE PRODUCTION.

In my estimation the firms employing grinders, polishers and buffers do not go deep enough into the quality of their skill. They leave the business with some plater or with an assistant foreman who have not sufficient experience to know how the work should be skillfully and economically done. While a man may become a first class plater with a knowledge of chemistry in two or three years, I consider five or ten years a short experience in grinding and polishing, for we all know that grinding and polishing is one of the oldest trades in vogue today, and while I am not condemning the canvas wheel for certain classes of work, it has been injurious in many ways. All work should be prepared as fine as possible before it goes to the buffer, for a buff takes lots of power and material when the work is left any way rough.

The writer has gone into several shops where he has found first-class wheels discarded, thrown under benches and lying around in all shapes. Naturally, a man who knows the use of such tools has picked a few of them up and put them in first class working order. These same wheels were discarded for canvas wheels. A canvas wheel will never leave a narrow edge or broad flat surface with the sharp edges standing out square. A wood (leather covered) wheel will do tenfold the work of a canvas wheel and do the work 100 per cent. better.

SPEED OF WHEEL A FACTOR.

The speed of a polishing wheel has to be taken into consideration for leather covered emery wheels. Where 18 inch wheels from 2½ to 4 inches in width are used, there should not be over 1,600 to 1,700 revolutions per minute. I have seen buffs discarded in certain shops in the West from 8 to 12 inches in diameter, whereas if these buffs were taken and run at 2,600 or 2,800 revolutions per minute for certain classes of work, it would actually do the work of a 22-inch buff. In one of these shops they were using buffs 22 inches in diameter; the speed was 3,600. They burnt the work, which left brown stains in it which were almost impossible to color out. The only way was to go very light on the buff to get the burn off. They were getting a big price for their work; I tried to explain in a polite way that they were moving the wheels too fast, consequently I lost my job. In this I have not referred to the emery disks or solid emery wheels, which have been quite an improvement, but no work looks so good when finished as that done by leather covered wheels put in the hands of capable men. I do not condemn the felt wheel, however, as a finishing wheel.

RUSSIAN CONTROL OF THE PRICE OF PLATINUM.

Refiners of platinum are worried by reports which they have received from Russian sources indicating that the Czar's government will put into effect in the next month or two a new plan for controlling the industry and more than doubling the price.

THE SUCCESSFUL JEWELRY DESIGNER.

By Lawrence B. Robbins.

The successful designer in any branch or line of work at the present day is without doubt the man who possesses a thorough understanding of his art, plus a practical working knowledge of the business in which he is engaged. He must not symbolize art alone, but must be artist and artisan combined, and be able to grasp the technicalities of manufacture, as well as beauty of design. The question then arises, Is the successful "jewelry designer" so closely allied to the metal industry as to be a hindrance to that industry, unless he be well posted as to its productive side? He most certainly is.

LAWRENCE B. ROBBINS.

Of what consequence would an architect be if all he could do was to draw a beautiful building, without a knowledge of its structure and erection? He must know to a nicety the qualities of different plasters, rocks, bricks, lumber, paints, etc., together with their prices and procurability. He must understand plumbing, masonry, carpentry, and a thousand other things too numerous to mention. Just so with the designer of jewelry. He, in turn, should study, and if possible procure a practical working knowledge of the various operations and methods of manufacture, studying metals, enameling, coloring, etc.

A great many so-called correspondence schools of design one finds advertised in the magazines, are both a delusion and a snare to the prospective designer, who, innocently tendering them his money for a course

EXAMPLE OF THE DESIGNER'S ART.

in jewelry designing, nine times out of ten on completion is handed a nice, juicy lemon in the form of a worthless diploma. I do not mean to create the impression that no proficient designers are turned out by these schools, but among the good, bad and indifferent ones, the really good ones are swallowed up in the majority of bad, while those who *have* gained value, may owe it to their own hard labor and practical turn of mind. Then there is always the danger of dissipating one's energies through superficial art education, making himself too one-sided, so to speak, which can only be counteracted by acquiring a thorough knowledge of the nature and possibilities of the materials in which his design is to be reproduced.

JEWELRY DESIGNING DIVIDED IN FOUR DIVISIONS.

Designers in jewelry may be divided into four separate divisions for convenience of description:

First—Silverware and cutlery.
Second—Gold setting and mountings.
Third—Badges and medals.
Fourth—Novelties and findings.

The first division, that of silverware and cutlery, is one with which the designer has a wide field for exercising his ambitions and conception of art. The character of the work, as every one knows, includes service sets, plaques, toilet sets, trophy cups and things of a nature wherein a designer can give full sway to his conception of the beautiful. To be successful, his knowledge of the art must necessarily be of a high standard. He is not hindered, as a rule, by cheap trade, the kind which demands something for nothing, but caters to a class appreciative of a good thing. He should master modeling as well as line and color, and understand chasing and spinning to a certain extent, and make himself thoroughly familiar with the metals. Cutlery demands a more thorough knowledge of dies, and he must strive for simplicity of outline and piercing, to involve as few cutting and piercing tools as possible to gain the end. Above all, he must keep in his mind the practicability and usefulness of the article he is designing.

The designer of gold settings is usually affiliated with a tool maker and die cutter. The character of the work is invariably small and minute and requires studious cutter-plate work owing to the peculiar characteristics of gold, which grows tough and brittle under manipulation.

The medal and badge designer probably has the most to contend with of any. First he should understand the nature of all the standard jewelers' metals, such as copper, bronze, gilding metal, brass, white metal, German silver, silver, gold, etc., as each has peculiarities of its own, and no two act alike under similar conditions. Owing to the peculiarities of his business he must be alive to current topics, and a good education is indispensable. He must be both artistic and inventive, possess a streak of humor, but still be able to turn to serious work when necessary. He should understand the application of enamels to the various metals, most especially the Cloisonné, which plays a large part in the badge industry of today, and consequently be able to design in color as well as in black and white. Badges and medals usually have to be designed and shipped within a specified time; therefore, the secret of his success as a badge and medal designer is to be a quick workman, able to grasp the essence of the correspondence almost at a glance, draw

for the utmost simplicity of tools (competition being so keen as to offer but small margins in many estimates), and above all, make the drawing accurate and clear, so that the die cutters may interpret his ideas without hesitation. Novelties and findings demand nearly the same kind of a man, though possibly, one with even more of an inventive mind than the preceding one.

NATURAL CONCLUSIONS.

To sum up in a nutshell, metal working and designing are too closely allied to be regarded otherwise. The designer in any branch should study the nature of every metal used in the industry to ascertain as nearly as possible the possibilities of each, so he may shape his course accordingly, rejecting any feature of his design which would entail expensive or complicated processes. The best of dies and tools are not infallible to injury. Nature's products can be blundered with or used to advantage, therefore the designer may be the means of increasing the standard of work for his employer, and all things being equal, increasing sales and profits, or he may keep his employer and himself with their noses ever close to the proverbial grindstone.

THE LOAN SHARK EVIL.

A Novel Method Devised for Its Elimination.

By F. C. Lawton.*

The rapid growth of money lenders who profit by the misfortunes of working people has been such as to call to the attention of many employers the evils surrounding this class of enterprising loan sharks. That their business is profitable is proven beyond doubt by the number which is supported in comparatively small cities. That their practices are insidious, evil, and often illegal, can be demonstrated by any one who will patiently investigate their methods. But, having reached these conclusions, the great problem is the remedy. That the loan shark exists because of an actual need must be admitted. The wage-earner is particularly helpless in the matter of credit. He can procure food, fuel and furniture on credit—usually, however, a costly experiment—but when it comes to obtaining cash for an emergency he is usually confined to one or two courses: borrowing on collateral, which in everyday parlance means patronizing the pawnshop, or pledging his earnings.

WEEKLY EARNINGS AS A LOAN ASSET.

The most attractive asset by far is the weekly earnings; in fact, it is rapidly coming to be regarded as the most attractive basis for a loan, especially in the smaller communities where industries have been long established and where transient help is a small factor. The lien upon the workingman's salary is eagerly sought by those who desire to invest their money at 100 per cent. or more. There is an inherent dislike on the part of the wage-earner toward a collateral loan, no matter how responsible may be the workingman's loan association or how high the standing of its officers. Hence the only avenue open in a time of emergency is the so-called salary loan. It is here that the workingman is fleeced and robbed disgracefully, and yet he silently submits, having no recourse. The alluring advertisements in the newspapers assure him that loans can be obtained quickly without publicity, and he is soon in the hands of the money lender, who assures him that he is simply doing a friendly act in letting him have the money. Incidentally, the borrower is required to sign certain papers as a matter of form, and these are usually long printed documents, and as he is nervous and agitated, the import is seldom understood. Often in his desperation to meet some obligation which is pressing him to the verge of distraction he is willing to sign almost anything that is put before him, and here the unscrupulous loan shark ties him hand and foot. The common rate of interest in these transactions is 10 per cent. per month, and it is not unusual for interest to be paid amounting to three or four times the principal before the opportunity presents itself to reduce the original amount of the loan.

A LOAN SHARK COMES TO GRIEF.

In one transaction, which caused the undoing of a famous operator in salary loans, the borrower had paid over $120 on a loan of $30. Having been obliged to move with his family some 300 miles, to the city of Montreal, he could not keep up with his usual regularity the payment of $3 per month interest. Immediately all sorts of scurrilous letters and threats poured in upon him; his employers were notified that he was dishonest, and attachment proceedings were immediately instituted to recover the principal, the interest due and 6 per cent. for the time that the interest was overdue. Happily these proceedings failed. The lender then discovered that the note upon which the borrower had obtained his original sum bore the indorsement of a fellow workman, who had brought the man to him as a stranger in the first place to obtain the loan. In return for this kindly act on the part of the indorser, the wily financier commenced a plan of intimidation against him, finally sending to his employers a paper purporting to be an assignment of wages on the part of the indorser.

Upon investigation on the part of the employer, the indorser strenuously protested that he had never signed such a paper, and yet admitted his signature. This development was so interesting that the employer decided to secure not only legal advice but a detective, and after a time was able to demonstrate this astonishing state of affairs: The indorser had on a previous occasion borrowed some money and had unwittingly signed a blank form of assignment of wages. The loan was in due time paid, and upon asking for the paper which he had signed he was assured that it had been destroyed. This was false, as the paper was held for some future use. Upon being cornered on this new loan where the indorser's name appeared, the astute money lender filled in dates and other matter to suit himself and attempted to use the paper to secure the indorser's wages.

The employer was so aroused at this condition that he pursued the matter to the courts and succeeded in having the money lender indicted for technical forgery and sent to State prison for a term of three years. This is simply an illustration of the conditions that prevail to a greater or less extent in all the towns and cities of this country. As stated above, the interest in this discussion is not to prove the existence of these conditions but to find a remedy for the evil.

*Superintendent of Gorham Manufacturing Company, Providence, R. I.

CIRCUMVENTING THE LOAN SHARK.

The employer referred to above commenced quite an investigation, and in a plant employing about 2,000 of the highest grade of skilled mechanics found to his surprise scores of men in the toils of these usurers. This could only be discovered by very patient inquiry, as the men are very sensitive in their misfortunes and prefer to bear their burdens silently and without complaint. Having become thoroughly aroused in the matter, this employer decided to ask for the co-operation of the employees in forming a local loan association whose membership should be restricted to employees in this particular plant.

This association has been in existence three and a half years, and during that time 2,850 loans have been made, aggregating $47,110.25, on a total paid-in capital of $4,000. The suspended loan account shows a possible loss of $27.91, while the earnings have amply justified the payment of a 12 per cent. dividend. This statement seems almost incredible, but it is a statement of an actual condition and not a theory.

The company is organized under the joint partnership laws of the State, shares are issued at $5 each, the entire amount being subscribed by the workmen, the employer furnishing no assistance whatever aside from advice in financial matters given by a representative on the board of directors in the person of one of the factory officers.

The operation of this loan society has been to drive the loan sharks out of business in this plant, and this had been testified to by collectors who previously made regular trips to the plant on each pay-day, and who now admit that their source of income is curtailed. The assistance rendered by the company is in honoring a draft on the paymaster by the employee who secures a loan from the society. Upon securing a loan the employee pledges to pay from his weekly salary a certain sum toward the reduction of the principal together with the accrued interest, which is figured at 1 per cent. per month. The average loan is about $25. The agitation of this matter has made possible legislation governing the assignment of wages, restricting the effect of such assignment to one year and imposing other regulations eliminating the chance of fraud. What has been accomplished in this community is possible anywhere in the United States.

THE ANALYSIS OF BRASS.

A Detailed Description of the Methods Employed for the Determination of the Constituent Composition of Brass Mixtures.

By Albert J. Hall.*

Since the publication of a previous article on "Analysis of Brass," I have had another year of experimentation in the manipulation of apparatus applicable to the rapid analysis of brass and also have had some time to see where changes could be made in some of the determinations; changes that would not only materially decrease the time necessary for a complete analysis, but also those that would increase the accuracy and reliability of methods.

ALBERT J. HALL.

Until recently, few people determined the iron content of the tin precipitate. It has been found, however, that from two-fifths to one-half of the total iron content of brass is carried down with the tin and if the iron content of it is not determined, the tin content of the alloy will always be high. For this reason, iron is determined on two different portions of the alloy.

Many chemists have abandoned schemes for the determination of zinc electrolytically, because of the black heavy deposit usually produced. Experiments in this laboratory seem to indicate that nitrates are the cause of the deposit turning black, and consequently heavy. The following scheme has been worked very successfully for several months, and good results have been obtained from it. The new method has not only produced light colored, firm deposits, but also has eliminated the necessity of evaporating the liquid from the copper determination to almost dryness—thus saving three or four hours in time. The method seems to work well on all grades and kinds of brass. An analysis consisting of the determinations of copper, tin, lead, zinc, antimony and iron in two portions of the alloy, can now be accomplished with the proper apparatus in about six hours.

*Chemist Michigan Smelting and Refining Company, Detroit, Mich.

TIN DETERMINATION.

Weigh out very accurately 2½ grams of brass, previously freed from all iron particles by a magnet. If the borings are oily, the oil must be removed by some solvent such as benzol. All iron cannot be removed from oily borings until the oil is removed in this way.

Place the borings in a 250 c.c. beaker, add enough water to cover the sample, then add 10 c.c. of nitric acid, sp. gr. 1.42. Immediately cover with a watch glass and add water if the action becomes too violent. Heat until the metal is entirely decomposed, then add 40-50 c.c. of hot water, and boil for about five minutes. Allow the precipitate of metastannic acid to settle somewhat, then filter through a numbef 589 white ribbon S. and S. brand filter paper, or one of equal quality for this purpose, into an Erlenmeyer flask, using moderate suction. A platinum cone will have to be used to keep the filter paper from breaking. The flexible cones work admirably and when one is used to the manipulation of the suction and cone, very few filters will be broken. The distinct advantage of the suction over the usual method of filtering is in the time saved and in the thoroughness of the washing.

Wash thoroughly with a hot 2% solution of nitric acid. If washed with suction, allow the suction to continue a minute or two after all the liquid is drawn through. By so doing, the filter paper is dried quite thoroughly and the usual subsequent drying of the filter paper is an oven before ignition is unnecessary. Ignite in a clean weighed porcelain crucible, observing the usual precautions of slow charring and burning of the filter paper. When the filter paper has burned off, put the crucible in the full

heat of the burner for ten minutes or over a blast lamp for five minutes. Cool the crucible partly in the air, then finally in a dessicator. Weigh the precipitate which will consist of the oxides of tin and antimony and some iron oxide that has been carried along with the oxides of tin and antimony. If phosphorus is present in the alloy, some of it will be found here, but due to the very small amounts found in most brass, its presence is usually neglected. Determine the iron content in the tin and antimony precipitate (see first part of iron determination). Calculate the weight of iron oxide as Fe_2O_3. Subtract this weight from the weight of combined oxides found above. Then after the antimony determination, calculate the weight of Sb_2O_4 present with the tin precipitate and deduct it from the combined weight of SnO_2 and Sb_2O_4. Then calculate the per cent. of tin present.

LEAD DETERMINATION.

The filtrate from the tin contains the nitrates of lead, copper, zinc and iron. Transfer the filtrate from the Erlenmeyer suction flask to a dish, preferably a good sized casserole. Add 10 c.c. of sulphuric acid sp. gr. 1.84 and evaporate to dense white fumes over a water bath or hot plate. The change of color from a dark blue to a very light blue or gray is an indication of the absence of all the nitric acid. It is well, when convenient, to arrange the work so that the evaporation can take place at night and at a slow rate. By so doing, the danger of spattering, due to excessive concentrated heat is eliminated, and no time is lost in the operation. It has been the practice in this laboratory to accelerate the rate of evaporation when done in the day time, by forcing a current of air over the evaporating surface. The electric hot plate is a good and safe substitute for the water or steam bath, especially when evaporations at night are in progress.

When all the nitric acid is removed, cool a few minutes, then add about 200 c.c. of hot water and dissolve the sulphates of copper and zinc. The lead will be left as a white precipitate of lead sulphate. Heat the solution to nearly boiling, then allow to cool, and the precipitate to settle. Filter through a fine filter paper, using suction if possible, and wash very thoroughly with a cold 5% solution of sulphuric acid. Remove the filtrate when the washing with sulphuric acid has been completed, and then wash out the sulphuric acid in the filter paper with a solution of alcohol and water in the proportion of 1.1. The purpose of the alcoholic wash solution is to remove the sulphuric acid. Its presence, even in small amounts, causes a disintegration of the filter paper during the drying, and renders the subsequent removal of the precipitate impossible.

Dry the filter paper after the complete removal of the sulphuric acid, then remove the precipitate to a piece of glazed paper by means of a spatula and camel's hair brush. Prevent the escape of the precipitate by covering it with a watch glass. Burn the filter paper in a clean weighed porcelain crucible. Use a very low heat, otherwise some of the precipitate that stuck to the paper may volatilize. Even with the best precautions, some of the lead sulphate will be reduced to metallic lead by the action of the carbon and on heating, it will be oxidized to the oxide, PbO. When the filter paper has burned, cool the crucible slightly, add about three drops of nitro-sulphuric acid made up in the proportion of three parts nitric acid and one part sulphuric acid. Heat slightly until all the nitric has evaporated then increase the heat sufficiently to drive off all the sulphuric acid. Be careful that no acid remains condensed on the side of the crucible. The lead and lead oxide are thus all converted to lead sulphate. Allow the crucible to cool slightly, then add the precipitate previously removed from the filter paper. Put the crucible over a low flame for four or five minutes. It is advisable not to allow the bottom of the crucible to get above a light cherry red color. Cool, first in the air and then in a dessicator. Weigh as lead sulphate. Calculate the per cent. of lead present.

COPPER DETERMINATION: ELECTROLYTIC METHOD, USING ROTATING ANODES.

The electrolytic method for copper determinations is so rapidly replacing the older standard volumetric methods, that it will soon be the prevailing one. For this reason I need only to refer to a standard volumetric method. The details of the Iodide method can be found in my previous article on "Analysis of Brass," published in the November, 1909, number of the Electrochemical and Metallurgical Industry.

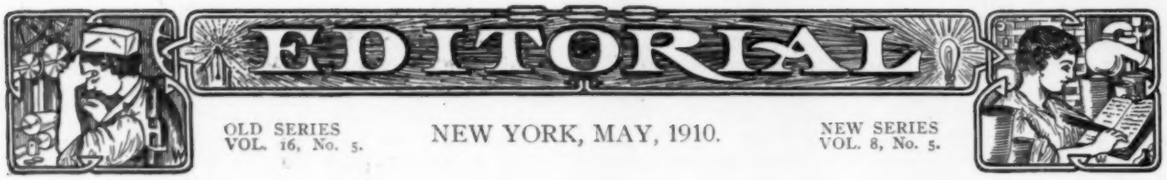
Points in favor of the electrolytic method are (1) ease of manipulation; (2) extreme accuracy, and (3) rapidity of execution.

Dilute the filtrate from the lead precipitate to exactly 500 c.c. in an accurately graduated volumetric flask. Shake the solution thoroughly. Take 50 c.c., or one-tenth, measured preferably in a 50 c.c. standardized volumetric flask. Dilute this 50 c.c. to about 125 c.c. in a tall non-lipped 150 c.c. beaker. It need not be heated. Add 2 c.c. of acid mixture (3 parts nitric acid and 1 part sulphuric) and about ½ gram ammonium nitrate. Plate out the copper on platinum gauze cathodes, using a current N.D. 100 equal to 3 to 5 amperes. The voltage will be about 4 to 8 for each cell. Rotate the anode about 500 to 600 times per minute. Cover the beakers with split watch glasses to prevent a loss of liquid due to the large evolution of gas from the anode. Cathodes presenting a surface of 200 sq. cm., with a current of 4-5 amperes will cause the liquid to get very hot, and if not cooled, it will boil. At this temperature the deposit will start to redissolve. This can be prevented by using a lower current or by placing a jacket of cold water around the beaker when the temperature reaches 80-85 degs. C. With cathodes of 100 sq. cm. area no trouble of this nature will be encountered. The copper will be completely precipitated in about 20 minutes.

When the metal is completely precipitated, which may be ascertained by adding a few drops of hydrogen sulphide water to a little of the solution on a test plate; a brown coloration indicating copper; reduce the current somewhat, never below 2-3 amperes† and remove the cathode. Wash the cathode by means of a wash bottle when removing it, taking care that it does not remain in the liquid an instant after the current is broken. If doing two determinations simultaneously, short circuit the cell whose cathode has been removed and continue the current through a second cell a minute before removing. Dry the cathode in an oven or hold it cautiously over a flame until just dry. A very neat and rapid way of drying a cleaned or copper-plated cathode is to ignite the alcohol adhering to it and then swing it violently through the air as long as it continues to burn. This manipulation keeps the dried portion of the cathode cool and thus prevents oxidation. The final drying of the bottom of the cathode may be done over any source of heat. When cool, weigh as metallic copper. Calculate the per cent of copper present in the original sample.

The deposit, if a good one, will be smooth, adherent, hard and a salmon pink color. A plating very red in color is an indication of too much acid. A spongy deposit at the bottom, when both nitric and sulphuric acids are used, is an indication of too much current for the concentration of the copper ions in the liquid. For stationary anodes and sheet platinum cathodes, the current should be very materially reduced and the time required for the plating will be lengthened about twenty-five times.

(To be continued.)



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THE METAL INDUSTRY

THE CONSOLIDATION OF
THE ALUMINUM WORLD
THE BRASS FOUNDER AND FINISHER
ELECTRO-PLATERS' REVIEW
COPPER AND BRASS

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A NEW IDEA.

In the Criticism and Comment column of this issue of THE METAL INDUSTRY is published a letter from Charles J. Caley, the first president of The American Brass Foundrymen's Association. Mr. Caley gives expression to an idea that we commend to those interested as a good one. The objects of the association are primarily to foster the welfare of the brass foundry trade at large and in no way can this be better accomplished than by a frequent getting together of kindred spirits. At the present time but one meeting a year is held of the national organization.

The city and State societies of the brass and other trades (some of them) meet once a month and derive great benefits thereby. Why not then have a mid-winter session as Mr. Caley suggests? We have no idea but what the suggestion will be well received, and now, just before the convention in Detroit, is the proper time to give birth to the new idea.

As for a suitable meeting place it seems fitting that Waterbury should come to mind as the first city to be honored. Pre-eminently a city of brass, although busy with diversified interests incident to or dependent upon the brass industry, she offers unexceptional advantages for the entertaining of a large body of men intensely interested in the business she has been so successful in.

Waterbury indeed stands as a synonym for brass and no city in the world is better qualified to give points on the manufacture and working of brass. A very good idea would be at this time for the officers of the association to get in touch with some of Waterbury's interested officials and get their views upon the matter. A few opinions are published in this issue on the same page with Mr. Caley's letter. Following Waterbury in her prominence as a brass city would come Bridgeport and New Britain, either of which we have no doubt would most cordially welcome the association at a midwinter session. We hope to see the matter brought up at the annual convention to be held in Detroit June 6 to 10, and acted favorably upon. THE METAL INDUSTRY will be glad to receive any expressions of opinions on the matter, that interested parties would care to send in.

THE LOAN SHARK EVIL.

In another column of this issue of THE METAL INDUSTRY we publish an article by F. C. Lawton, the superintendent of the Gorham Manufacturing Company, Providence, R. I., on the subject of the "loan shark" and a method for his elimination. Too much cannot be said regarding the damage done to society at large by the methods employed by these un-

scrupulous usurers to squeeze money out of those who are unfortunate enough to get in their clutches. By enticing and alluring advertisements which by the way no self-respecting newspaper ought to publish, they trap the perplexed and hard-pressed workman into signing what might just as well be his death warrant as far as peace of mind is concerned.

Too late he discovers that he has bound up practically all of his possible savings from his labors for years to come in order to satisfy the insatiate and wholly unreasonable demands made upon him by the "shark." Mr. Lawton tells in his article how a deplorable state of affairs among the employees in a large corporation was discovered only by chance; and describes in an interesting way a novel method which was devised to circumvent the wiles of this so-called legal thief, the "loan shark." What has been done and is being done in one company can be accomplished in another.

A little interest taken by employers in the out-of-hours welfare of their employees is all that is necessary to root out the evil and eliminate from society that class of parasites that live upon the earnings of others, with no other exertion than by the exercise of their wits. Investigation and the final installation of some such loan system as Mr. Lawton describes can cost the firm but little and this expense is more than justified by the returns. A workman worried and distressed by financial matters of a personal nature is a very bad investment viewed from a commercial standpoint. He cannot put his heart and soul into his work which is so essential in these days of high speed production. Therefore by relieving his mind of just such matters as the loan shark caters to, his efficiency is highly increased and he is thus no exception to the adage that "A laborer is worthy of his hire."

THE METAL INDUSTRY will be glad to do anything in its power to aid in the eradication of this evil in the industrial world and offers the free use of its columns for expression of opinions from its readers, be they employer or employee.

USE OF PHOSPHORUS.

The manufacture of alloys and special mixtures involving or requiring the use of phosphorus has long been considered as one of the most dangerous operations incidental to the founding of metals. While considerable has been written in text books and papers prepared for scientific societies and articles in trade journals, some of which give valuable instruction, the majority, however, give directions that do not direct and generally conclude by evading the question altogether. We are prompted to prepare this little dissertation by noticing some advice (?) given recently by an expert in answer to a query as to the best method for introducing phosphorus into a bronze mixture. The expert's advice is excellent as far as it goes, but unfortunately, aside from the few well known facts which he dilates upon quite extensively, we fail to discover that he has helped his correspondent out of the difficulty at all. After he has reviewed the reasons why phosphorus is dangerous and mentioned a few precautions regarding its use he calmly evades the point at issue and advises his inquirer to purchase his phosphorus in the shape of an alloy already made up! This seems to us to be a very excellent way to give advice that does not advise, and in view of the above facts we venture to make a few suggestions as to how to use phosphorus in the manufacture of phosphorized metals. THE METAL INDUSTRY has from time to time published articles upon this subject* which, if followed explicitly, will give the desired results with a minimum of danger and loss in phosphorus.

If it is considered absolutely necessary to use yellow phosphorus a very simple and comparatively safe method to pursue is to prepare the phosphorus in small cakes of the required weight by taking the sticks as they are obtained in the market and melting them into cakes under water so that each cake will represent a single charge. If it is necessary to use charges from a half pound up, these are readily obtained from dealers in this material in cakes of the required weight, and of a convenient shape for introducing into the molten metal. The required amount of phosphorus for a single charge is then immersed in a solution of copper sulphate for thirty minutes when it will become covered with a thin film of copper, due to the galvanic action between the copper and the phosphorus. This copper covered cake can then be handled with a large degree of safety from spontaneous combustion, but as an additional precaution it is best to wrap it in a piece of dry cloth, the interior surfaces of which will absorb the small amount of moisture which still adheres to the cake after it is withdrawn from the copper sulphate solution. This package is then placed in a phosphorizer and introduced into the crucible of molten metal without any danger of explosion. In case any of our readers are not acquainted with the phosphorizer it is only necessary to say, that it is made of the same materials as a graphite crucible, and is of the same comparative shape, but has a number of holes bored through the sides and the bottom in order to allow for the escape of gas. The phosphorizer is used upside down and the bottom is usually made quite heavy to allow for the screwing on of a long iron rod, which serves for a handle to push the phosphorizer and its contents below the surface of the metal. The surface of the metal should be covered with charcoal and the phosphorizer with its charge is gradually pushed down through the charcoal, until the phosphorus comes in contact with the metal.

The same precautions should be observed in the care and use of a phosphorizer as in the case of a crucible; it must be well annealed and dry.

An entirely satisfactory and absolutely safe and convenient as well as economical method for phosphorizing metals is to use the red or amorphous form

*January, 1909. September, 1909.

of phosphorus. This phosphorus is identical in every respect chemically with the yellow variety, in fact it is produced from the yellow variety by simply heating the latter for forty hours at a temperature of 250 degs. C. The red form of phosphorus does not ignite until it has been heated to 240 degs. C., therefore it is not necessary to keep it under water or take any other precaution against spontaneous combustion other than to preserve it in a glass bottle. The amount of phosphorus that can be introduced into a mixture by employing the red variety is identical with that obtained from an equal amount of yellow, and therefore by employing the red, all danger of explosions are eliminated, even though the most crude methods are adopted for its introduction into the crucible.

As regards the question of price of the two products, of course, as might be supposed, the red will cost in the neighborhood of fifty cents per pound more than the yellow, but when we consider the vast difference in safety in handling, and also economy in its use this small difference is completely lost sight of. The question might be raised as to the commercial purity of the red variety of phosphorus, but when we remember that the red is formed from the yellow, as remarked above, by a mere process of heating, it is evident that if the yellow used to start with was pure, the red must be so. The only point to be sure about is that all of the yellow has been converted into red, and this being the case there is really no objection to the substitution in metallurgical processes.

CRITICISM AND COMMENT
WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ARTICLES PUBLISHED IN THE METAL INDUSTRY. SUGGESTIONS WELCOME.

MIDWINTER MEETING OF AMERICAN BRASS FOUNDERS' ASSOCIATION.

To the Editor of THE METAL INDUSTRY:

As it will never be possible to hold a convention of foundrymen and manufacturers in Connecticut, as will be held in Detroit, Mich., June 6-10, it occurred to the writer that a midwinter session of the American Brass Founders' Association would not be amiss, providing it were held at a point where sufficient interest would manifest itself to warrant the holding of same. Waterbury, the brass center of Connecticut, would in the writer's estimation be an ideal city for a meeting of the kind, surrounded as it is by other large brass centers, and accessible from all points by train and trolley, and with the best of hotel accommodation. Waterbury could be depended on to give a right hearty welcome to the foundrymen or sheet metal workers. It is not necessary for me to go into this matter very thoroughly or to show by facts or figures why Waterbury is the most suitable of the many brass cities of Connecticut for the holding of such a meeting, as the subject has been placed before your readers in a very concise and detailed form "By Waterbury."*

I should like to see this matter brought to the attention of the Waterbury manufacturers through the columns of your journal. No doubt they will be pleased to entertain a proposition of the kind as they look with favor on anything that tends to advertise their city or its products. It is possible they would approve it to the extent of sending a committee to Detroit to lay the matter before the American Brass Founders' Association for their consideration. Personally I would like to see the Association meet in Connecticut, first because it is the largest brass center in America, and second from an educational standpoint it would be a lasting benefit to those who are fortunate enough to attend. With the co-operation of the Waterbury manufacturers and the valuable assistance your journal would render, I believe the attendance would be such as to warrant holding midwinter sessions in other parts of the country.

CHARLES J. CALEY,
First President American Brass Founders' Association.
Peterborough, Canada, April 19, 1910.

WATERBURY OPINIONS ON A MID-WINTER SESSION.

To the Editor of THE METAL INDUSTRY:

"Mr. Caley's suggestion about holding a mid-winter session of the American Foundrymen's Association in Waterbury is all right if we could induce those busy men to desert their homes for one or two weeks and come from the far West to busy New England. I'm sure there is much they could learn here and a royal reception would be given by the manufacturers in Waterbury and all through the Naugatuck valley. I don't know any local men who are members of the American Brass Founders' Association, but perhaps if the matter was brought to the attention of the convention some action might be taken." CHARLES F. BROOKER,
President American Brass Company.
Ansonia, Conn., May 2, 1910.

"It would be a good idea to have such a gathering as proposed by Mr. Caley, and Waterbury, as is stated, is an ideal city for such purpose. Waterbury is getting to be known as the 'Convention City' for brass manufacturers. I would suggest, however, that some of the officers of the American Ring Company, and the American Pin Company be consulted as we do not belong to the Association, but we are willing to aid in any way to bring about a meeting."

L. E. FITZSIMMONS,
Secretary-Treasurer Novelty Manufacturing Company.
Waterbury, Conn., May 3, 1910.

"I am not a member of the American Brass Founders' Association, but the suggestion about holding a mid-winter session in Waterbury is a good one. We have everything here to interest people engaged in the business, and I hope THE METAL INDUSTRY will be successful in getting the members of that association to come here."

JOHN B. BURRALL,
Treasurer Plume & Atwood Manufacturing Company and American Ring Company.
Waterbury, Conn., May 2, 1910.

"There will be a meeting of the New England Foundrymen's Association in Hartford May 2, and there will be another meeting held in this State later in the year, probably in Waterbury or Bridgeport. I doubt if it would be possible to induce the American Founders' Association to come here, but they would be welcome. Perhaps the subject may be taken up when the New England Foundrymen's Association meets."

LOUIS PIERRAULT,
Vice-President and Manager Waterbury Casting Co.
Waterbury, Conn., May 3, 1910.

"We cannot have too much of that sort of agitation to bring the manufacturers together, and Waterbury is the proper place to hold a convention at any time of the year."

IRVING H. CHASE,
Secretary Waterbury Manufacturing Company.
Waterbury, Conn., May 3, 1910.

* THE METAL INDUSTRY, January-March, 1910.

MANUFACTURE OF PURE COPPER CASTINGS.

To the Editor of THE METAL INDUSTRY:

In the March number of THE METAL INDUSTRY Daniel McPhail, of William McPhail & Sons, of Glasgow, Scotland, has asked for some clearer explanations on the casting of copper in reference to the article in the January, 1910, issue on "Pure Copper Castings."

First of all he states the standard for conductivity of copper is taken relatively to silver being the highest viz.: 100 per cent., and therefore takes exception to my taking pure copper at 100 per cent. conductivity. I have very often found ingot copper electrolytically refined to show 100 per cent. conductivity.

He also states that in my article I proceed to state the following: "After the copper was melted it was poled with hickory poles to bring it to pitch or to reduce oxides." He wants to know if this means that sufficient carbon was added to the surface of the molten metal to counteract the oxygen. Also what is the appearance of correct pitch and how do you tell density by testing in a vise? Further he would be glad to know approximately what I consider to be the critical temperature of copper before casting.

The poling of the copper is done to remove the oxygen that the copper has taken up in smelting. The reduction is effected by the means of any kind of green wood, hickory being the hardest, is the most economical This being buried in the metal bath produces volumes of hydrocarbon and other reducing gases, and rapidly removes the excess oxygen. The surface of the metal is also covered with charcoal to prevent access of air.

Also what is the meaning of correct pitch? The appearance of pitch is when the samples taken and poured in a small ingot show no contraction or deposition on cooling and the texture is extremely fibrous and silky.

The determination of density by testing in a vise is effected when the copper samples are bent in a vise and show no cracks at the edges and when broken the structure is a close fine grain. Approximately what I consider to be the critical temperature of copper before casting, I have found for sand casting to be 2,500 degrees Fahr., and for casting copper ingot 2,200 degrees Fahr.

W. J. REARDON.

Wilmerding, Pa. April 25, 1910.

THE POLISHING OF METAL—SHOULD WORKMEN SIT OR STAND?

To the Editor of THE METAL INDUSTRY:

Noting Mr. Schutz's inquiry* regarding the best position for polishers of metals to assume while doing their daily stunt of tickling brass castings, such as the Mueller people make, a class of work so perfect that it leaves the sand all but polished. We would say that the sitting position is to be advocated when the work is light to medium and the standing attitude when the work is sufficiently heavy to necessitate the operator having a good grip on himself, the casting and the floor, though we have witnessed the exact reverse of these conditions many times.

The height of the buffing lathes from the floor to the wheels enters very largely into the matter as to which may or may not be the correct position for the operator to assume, and until such time as all polishers are so constituted as Lincoln said, men should be, "with legs sufficiently long to reach from their bodies to the floor," we will have to be content to make the best of conditions as we find them, and provide stools for those whose style of architecture is such in the rear of their mid-ship section, that bunions, corns, callous growths have no terrors that they are bound to respect. While the standees who are prone to the acquisition of "kidneys in their feet" will have to "grin and beer it." As Artemus Ward once said, "this is a crool world," and it is particularly so to polishers, so that if we can do anything to make this unhealthy occupation better in any way there should not be any quibbling about doing it. Moreover, we consider the matter of removing the buffings from the shop by the medium of exhausters far more important that the attitude polishers assume when working.

Our good friend Schutz may differ with us in this matter, so we will have to wait until the American Foundrymens' Association convenes at Detroit next June when we can fight it out to a finish, as to whether polishers should use Turkish lounges, hammocks or rocking chairs when putting on a "Pittsburg finish" on brass goods. By a "Pittsburg finish" we mean that beautiful shine known as "a high polish with deep scratches."

Brooklyn, N. Y., May 2, 1910. W. H. PARRY.

*THE METAL INDUSTRY, April, 1910.

Shop Problems

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE OF THE METAL INDUSTRY. ADDRESS THE METAL INDUSTRY.

ALLOYING

Q.—We have occasion to melt copper, tin, lead, zinc, etc. in No. 50 graphite crucibles in the manufacture of brass and bronze castings such as bearing boxes, linings for cylinders, etc. We have formulas for doing this work but do not use a pyrometer. It is our intention to obtain a pyrometer and pour our metal at stated temperatures. Our trouble seems to be in not getting uniform castings. At times there appears to be more copper than should be obtained with the mixture that we use. Can you give us the proper temperatures which the metal should be poured in order to get the best results and not burn out the constituent elements in the mixture?

A.—There is no pyrometer on the market that can be used in routine brass foundry work with success. A capable foreman is better than any pyrometer you can get when it comes to judging pouring temperatures. Limestone and fluor-spar make a good flux. You do not state your mixtures, but if they are in lead you will have trouble in alloying them as lead oxidizes readily. Many foundries buy their high lead alloys in ingots for this reason. —J. L. J.

Q.—I should like to get a formula for a 10-kt. gold for rolled gold plate.

A.—It is impossible to give the best formula for 10-kt. gold, because a formula that might be ideal for one purpose might be absolutely useless for another.—O. A. H.

ANNEALING

Q.—Can you publish a receipt that will keep sterling silver sheets that are annealed in air-tight boxes as bright as if annealed in an open fire and pickled in a solution of oil of vitriol?

A.—Completely cover the silver with sifted wood ashes when placed in the air-tight boxes. We think this will overcome your trouble and give you a good bright surface. This is the method used in annealing very fine copper or bronze wire to avoid pickling after annealing. The wire comes out quite bright if allowed to cool before removing from the annealing boxes. This should also apply to silver.—C. H. P.

CLEANING

Q.—Will you kindly advise us if you have any information regarding the following: We are producing a satin finish or iron lined brass, and at the present time are resorting to acetate of lime for cleaning before lacquering. We would like information regarding the use of carbon tetra-chloride and naphtha and whether the chemical action interferes in any way with the lacquer.

A.—The benzine method is probably the best you can use for particular purpose. By its use stains are avoided that would probably occur by using the wet or chemical methods. Carbon tetra-chloride gives the same results but is more expensive, although non-explosive, which adds greatly to its advantage. It

is claimed that when as much as two parts of benzine is added to one part tetra-chloride its non-explosive qualities are maintained. Benzine or tetra-chloride cleansing does not interfere with the lacquering. It is advisable after cleansing in this manner and drying out in finely sifted maple sawdust, to wipe the articles on a very slow running canton flannel buff wheel of not less than 12 inches in diameter and a 3 or 4-inch face.—C. H. P.

COATING

Q.—Can you recommend to us a formula for making a coating generally used for sheet metal goods, such as steel frying pans, etc.?

A.—There is no chemical method that could be used commercially that would be sufficiently cheap for your purpose. It appears to us that a blue collodion lacquer could be used to advantage. This would protect the surface and give a pleasing effect. It is used by many concerns as a finish for their goods. See advertisements of lacquer companies in THE METAL INDUSTRY. —C. H. P.

DIPPING

Q.—Can you give us a formula for a cold dip for German silver, which will give a fairly rough crystalline finish similiar to sand-blast?

A.—A good bright dip can be made by using the following:

Aqua fortis, 38 per cent	1 gal.
Sulphuric acid, 66 per cent	1 "
Rock salt	6 ozs.
Water	2 qts.

—C. H. P.

GILDING

Q.—Can you give me any information regarding the so-called "French gold"? Is it produced from a salt and water or a cyanide solution?

A.—Two articles on salt water gilding that will prove of much interest to you are salt water gilding in the January, 1909, issue of THE METAL INDUSTRY by William Schneider. Also salt water gold coloring solutions by Oscar Hillman, January, 1910, issue.

A solution made up from cyanide and gold will not give the color you require. The formula originated by Roseleur is probably one of the best in existence for light-colored golds. The formula consists as follows:

Water	1 gallon
Phosphate of soda	8 ounces
Bisulphite of soda	1 ounce
Cyanide of potassium	2½ dwts.
Gold reduced to neutral chloride	2½ "

If commercial chloride of gold is used not less than 6 dwts. should be used in each gallon of solution. The temperature of the solution should be from 130 to 160 degs. A platinum anode gives the best of results.—C. H. P.

MECHANICAL

Q.—How would you obtain the co-efficient of friction on a bearing?

A.—The co-efficient of friction of a bearing is obtained by dividing the friction in pounds by the total pressure on the bearing, expressed in pounds. For instance, if a bearing carrying a load of 875 pounds gives an average friction of 5.66 pounds, the co-efficient of friction will be 5.66÷875 or .00647.—J. L. J.

MELTING

Q.—We have some difficulty in melting down our aluminum borings and turnings. Kindly give us some information as to the best way of melting them to get the best weight out.

A.—Aluminum borings and turnings are best run down in kettles of a shape similar to those used for making Babbitt alloys. The kettles, however, should be made of graphite instead of cast iron, to avoid contaminating the aluminum with the iron. A bath is first made by melting some heavy scrap and then the borings and turnings are gradually added to this bath, each addition being allowed to melt before another is made.——J. L. J.

OXIDIZING

Q.—Is the Bower and Barff process of oxidizing iron patented? If so, what is its patent number?

A.—We understand that the patents covering this process have expired.—K.

PLATING

Q.—What strength of electric current should be used for producing the rose gold finish on jewelry?

A.—The amount of electric current used in producing rose gold would vary according to the quantity of work put in the solution. At a rough estimate, it should be about 4 amperes per square inch of cathode surface.—O. A. H.

Q.—Will you tell me what is meant by a small intense current as applied to electroplating?

A.—A small intense current is an expression commonly used among colorers to denote a current that is high in voltage with a small amperage, as 8 volts and 12 amperes, or 10 volts, 25 amperes, etc.—O. A. H.

Q.—I want to get a platinum finish on a whitish colored gold.

A.—For your purpose the following formula will give good results:

Chloride of platinum	½ oz.
Phosphate of soda	10 "
Phosphate of ammonia	½ "
Common salt	½ "
Powdered borax	¼ "
Water	1 gallon

Use the solution at 180 degs. F. with a platinum anode. Manipulate the anode with the hand in the usual manner for gilding. A medium current gives the correct color. A very strong current produces a dark gray tone.—C. H. P.

ROLLING

Q.—Kindly give me a good receipt for bronze that will stand the rolling mill and make good castings?

A.—The sand casting grades of Parsons manganese bronze, Delta metal and other similar alloys, if they are virgin metals and have had no scrap added, are nearly ductile enough to stand the rolling mill and also to make good sand castings. It is customary, however, to slightly change the composition of the sand casting alloys so as to obtain greater ductility and the alloys so changed are known as forging alloys.—J. L. J.

TESTING

Q.—Please publish results of a mechanical test on aluminum alloy castings for automobile work.

A.—Here is the report of a test made on a test bar of aluminum alloy consisting of 70 parts aluminum, 27 parts zinc and 3 parts of copper.

Dimensions of sample	550 inches dia.	
Area	.238	square inch
Reduced dimensions	.547 inch	
Reduced area	1.2	per cent.
Elastic limit	5,000	pounds
Elastic limit per square inch	21,000	pounds
Maximum strength	10,000	pounds
Maximum strength per sq. in.	42,100	pounds
Elongation by inches	.01-.02	
Elongation in 2 inches	1.5	per cent.
Fracture	granular sound	

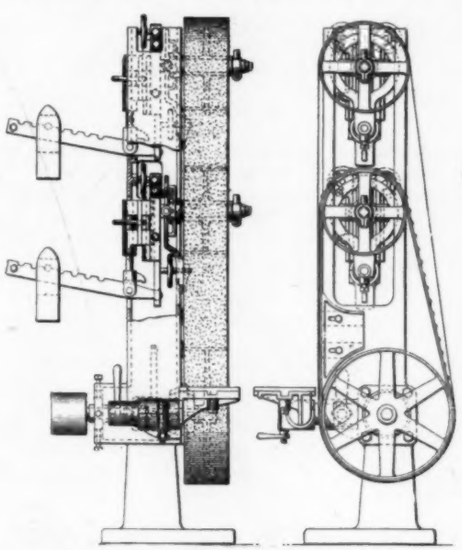
PATENTS

REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

951,824. March 15, 1910. Process of Cleaning Articles of Metal and Glass. H. T. Mauley, Webb City, Mo.

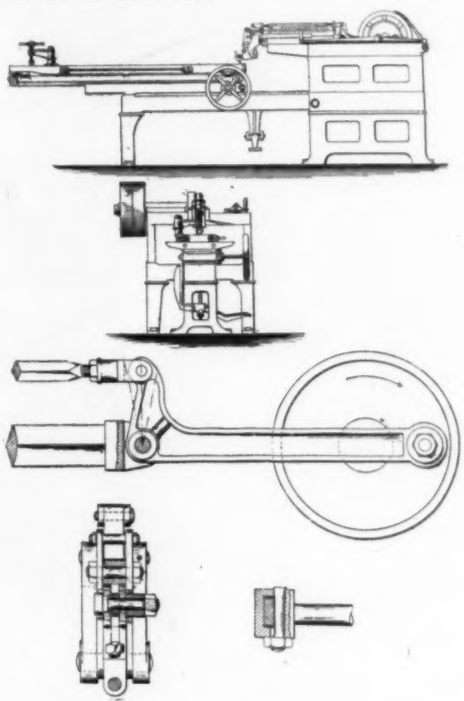
An improved process for cleaning gold, silver, plated and similar articles, which is conducted in the following manner: The articles are immersed in a solution of a compound including 97% $NaHCO_3$ and 3% NaCl or salt, said mixture being in a receptacle having a surface of tin submerged therein, bringing the articles into contact with the receptacle while immersed, and maintaining the mixture or solution at a temperature of not less than 212° F., subjected to an electric current.

953,031. March 29, 1910. Grindind and Polishing Machine. John Housman and J. C. Blevney, Newark, N. J. Assignors to the Athar Tool Company. A corporation of New Jersey. As shown in cut this is a machine designed for the grinding and polishing of metal articles. The machine consists of a frame to the lower portion of which is a main driving shaft supported in adjustable bearings. To one end of the shaft a pulley is attached over which passes a belt to drive the machine. A driving pulley is attached to the other end of the shaft. The shaft is mounted in a sleeve, the middle portion of which is enlarged to form an oil chamber. The end of the sleeve next to the driving pulley is provided with ribs having circular faces. The ribs are fitted in a



spherical shaped bearing formed on the inner portion of the shaft bearing. At the other end of the sleeve there is a rectangular bearing against the faces of which bear adjusting screws. This construction permits the pulley carried by the shaft to be adjusted either vertically or horizontaliy by means of the adjusting screws. The polishing or grinding by this machine is accomplished by a belt covered with abrasive material which moves over the pulleys and is supported by a leather or metal belt which runs underneath and at practically the same speed. The face of the under belt has raised portions and depressions on its surface and thus prevents the particles of emery, etc., which may become detached from the polishing belt, from "rolling up" and cause uneven grinding. A full description of this machine in vertical and horizontal form was published in The Metal Industry for April, 1910.

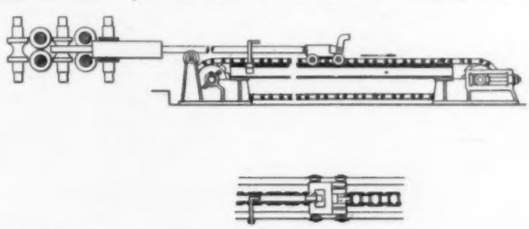
953,117. March 29, 1910. Metal Scraping Machine. P. R. Bissell, Waterbury, Conn. Assignor to the Waterbury Farrel Foundry and Machine Company, Waterbury, Conn. This machine as shown in cut is designed to be operated at high speed and is provided with means for imparting movement to the cutter; means for adjusting said movement in relation to the lengthwise movement, both as to time when said movement shall begin and the time consumed thereby; as well as to make the machine of the fewest possible parts, so designed as to have the maximum strength at the minimum cost.



The patent covers for a metal scraping or "overhauling" machine, the combination with a reciprocating slide; of a rotary disk; a connection having an arm thereon connecting said rotary disk and slide; a tool holder movably mounted in the slide; side plates movably mounted on the tool holder; a roll between the plates; and spring means connected with the side plates and a fixed part on the slide for holding the roll in contact with a cam projection.

954,880. April 12, 1910. Rolling Mill for Producing Tubes. Mathias Peters, Beurath, near Düsseldorf, Germany.

The invention, as shown in the cut, relates to rolling mills for producing seamless tubes from a hollow ingot or blank; and it has for its object to extract the mandrel employed in such



mills while the work-piece still moves through the rolls, whereby the time required for the production of the tube will be materially lessened, and a saving of space and expense effected.

In rolling devices for rolling tubes over mandrels, in which several pairs of rolls, inclosing an oval-shaped profile, are ar-

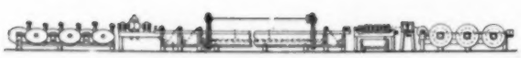
ranged behind each other, the extracting of the mandrel from the finished tube has hitherto been usually accomplished in a separate operation by means of a suitable device arranged at the back of the rolling mill.

The present invention relates to a device by means of which the mandrel is extracted, while the work-piece still moves through the rolls. This extraction is so arranged that the extracting of the mandrel is begun when the outer end of the work-piece, or the tube, has left the first pair of the stretching rolls and moves between the last pair of the equalizing rolls, which latter exercise a less pressure upon the same than the first pair of rolls, and between which therefore the mandrel will be less firmly held. The operation of extracting the mandrel will be concluded nearly at the same time or a little later than when the ready rolled tube leaves the last pair of rolls. In this manner the time required for the production of the tube will be materially lessened, so that the tube will arrive at the draw-bench, where the oval-section-shape will be converted into the exactly circular shape, in a still highly heated condition. A saving of space is also attained, as well as a saving of working expenses, as the plant can easily be arranged in such a way that the device works automatically.

954,833. April 12, 1910. Wire Plating Machine. George L. Wallace, of Bridgeport, Conn.

This invention relates to new and useful improvements in machines for electroplating continuous strips of metal, as for instance continuous lengths of flat strips, chains, round and barbed wire.

It is the purpose of the design to provide an improved form of machine, shown in cut, comprising a series of tanks, cleaners and polishers, through which a series of continuous lengths of material of the above class may be automatically passed for plating. The metal is first fed through a sand blast and then an electrocleaner tank and next a cleaning solution for rinsing preparatory to plating. It is thus drawn through the plating solution from whence it is again run through another cleansing solution and finally in a finisher for polishing, whereupon it is automatically wound upon rolls or forms as desired.



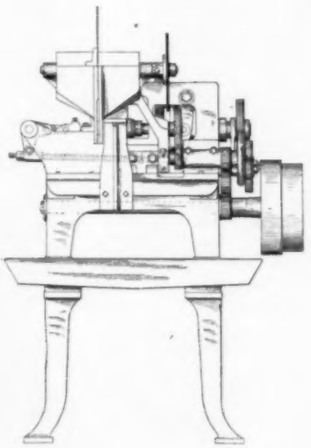
A further object of the invention is to provide a machine by means of which heretofore difficult pieces of work may be completely plated in continuous lengths, as for instance chain, and especially barb wire, and in a way that the ends or edges as well as all other parts will be competely covered; to design the machine so that a number of such strands can be plated at the same time, thus greatly increasing the capacity of the machine.

The patent covers the following claim:

In a machine for plating continuous lengths of wire, the combination with an electroplating tank, means for directing the material to be plated through the lower portion of the tank, a frame within the tank above the material for supporting anodes, standards secured to the sides of the tank, winding shafts mounted in the upper portion of the standards, cables connected intermediate of the frame and the cross shafts for raising and lowering the frame, means for operating the shafts to effect the winding, and means for drawing the material through the tanks for the purpose of plating the same.

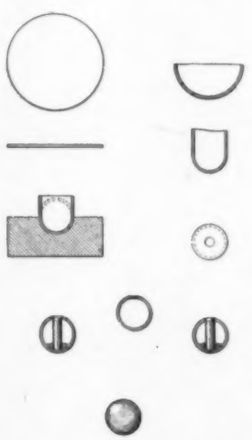
955,373. April 19, 1910. Bifurcating Machine. R. L. Wilcox, Waterbury, Conn., assignor to the Waterbury Farrel Foundry and Machine Company, Waterbury, Conn.

The machine shown in cut has for its objects, among other things, to provide a machine that will perform bifurcating or slitting work with means for delivering an uninterrupted flow of blanks successively and automatically onto the holding devices that rigidly grip the blanks while being operated on; means to prevent the endwise movement of the blank in the holding devices during the sawing operations; means for aligning the blanks before the same are presented to the saw mechanism; means for stripping



the blanks from the holding devices after the sawing operation; and means for insuring the positive withdrawal of the saw from the blank if some of the operative parts should break, or become inoperative for other reasons; and to produce these, and other desirable features, with mechanism composed of few parts, so designed as to be economically constructed and readily assembled.

955,698. April 19, 1910. Process of Making Hollow Metallic Ball. J. W. Schatz, Chappaqua, New York. Assignor of one-half H. A. Schatz, Chappaqua, N. Y. A method for making hollow balls of steel, brass, copper, aluminum, or any other suitable metal as shown in cut. The patent covers the following claim:



A method consisting in pressing a disk of metal by successive forming operations into the general shape of a sphere having a hole in one side, reaming the hole to dimension, then introducing suitable soldering material into the sphere, then inserting a shouldered plug having sufficient length to reach across the interior of the sphere in the hole, then additionally pressing the article into more accurate spherical shape and upon and about the shoulder on the plug and then subjecting the article to the action of heat.

INDUSTRIAL

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

NEW METHOD FOR MOUNTING PATTERNS.

By Hugh McPhee.*

A method by means of which patterns may be mounted for use on the moulding machine or for bench moulding has been in vented by the writer.

This system has been thoroughly tried out in the foundry of the Maxwell-Briscoe Motor Company at Tarrytown, N. Y., where it has been in constant use since the foundry was started.

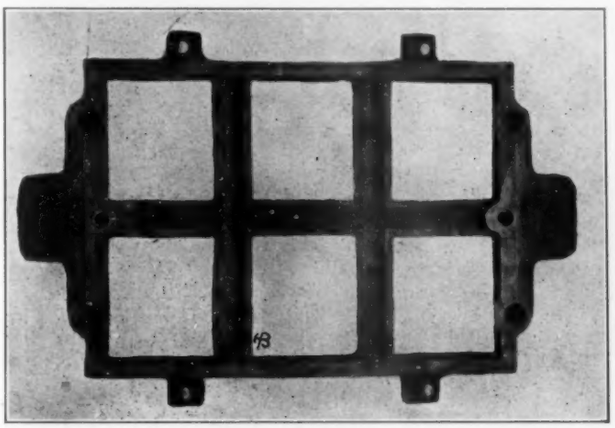


FIG. 1. FRAME FOR HOLDING COMPOSITION.

In planning for the preparation of this firm's patterns, for use in the moulding machines, with which their foundry was equipped, it was noted that a great many pieces did not fit themselves to ordinary match plate work because of a lug, boss, or some other projection, being off center, thus preventing a straight parting line. This meant a lot of bench work, on patterns from which thousands of castings were required or else the adoption of some other way of mounting patterns, than any that had ever been tried.

A series of experiments were then made, resulting in the complete success of the method herein described; by which patterns with an uneven parting are as easily mounted on plates for use in a vibrator machine, or for bench moulding, as are those with a straight parting line, and at a much smaller cost than it was ever thought possible to mount patterns.

By the general use of this method, the Maxwell-Briscoe Motor Company are making brass castings in their foundry, cheaper than castings of similar design can be made anywhere else.

A master pattern of the required casting is first made in wood. From this enough white metal pattern castings are made to fill the flask. After finishing up these white metal master patterns, the services of the patternmaker are dispensed with, all the rest of the work in making the plate being done in the foundry.

A perfect mould of these patterns, both nowel and cope, is then rammed up and after taking the flask apart, and drawing the patterns, metal is poured into each impression separately, until it is filled flush with the parting line, a small ladle being used for the purpose. This is done in each half of the mould, which has been left apart since drawing the master patterns.

Iron frames, which take the place of the plates on which patterns are generally mounted for the machine moulding, are then placed on each half of the flask, and a composition poured into them until they are solid. These frames, a cut of which is shown, Fig. 1, are made to fit the flasks perfectly. The composition with which they are filled is held in place with the bead around the inside of the frame shown at "B."

*Superintendent of Foundries, The Maxwell-Briscoe Motor Company, Tarrytown, N. Y.

The metal patterns on the plate will, if a proper mixture has been used, be found very smooth and perfect, as they were pourd individually, and therefore without pressure. A piece of emery cloth will do all the finishing they will require. These plates can be used equally as well on the machine, or on the bench, but of course in either case the flasks must be perfectly interchangeable every way, with the pins on the plate.

Any foundry, contemplating the adoption of this method of using mounted patterns, and having on hand either grated or loose patterns of parts they would wish to put on plates, can make these plates right from their present patterns. Some examples of this are shown in Figs. 2 and 3. The making of master patterns previously described in order to cast the plate is only intended to be used where no pattern whatever exists of the part wanted.

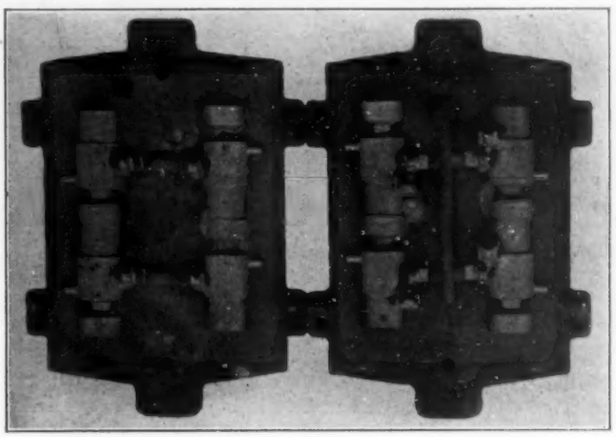


FIG. 2. LOOSE PATTERNS MOUNTED ON PLATES.

This system, which is protected by patents pending, will be shown at the Detroit Convention of Allied Foundrymens' Association, June 6 to 11, 1910, by Mr. McPhee, who will be glad to explain more in detail the novel working features.

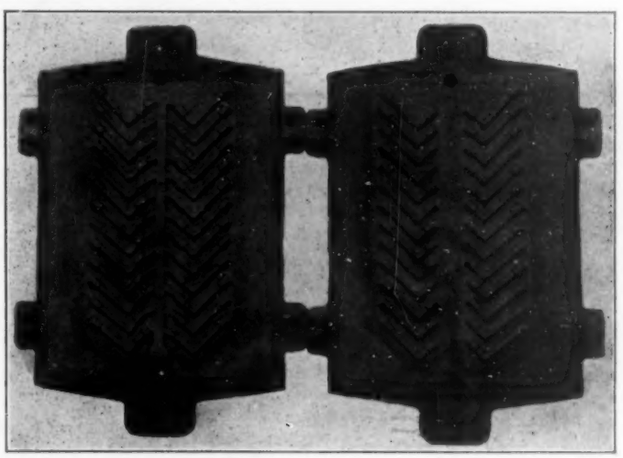


FIG. 3. GATED PATTERNS MOUNTED ON PLATES.

NEW DEVELOPMENT IN MOLDING MACHINES.

A Description of the New Farwell Molding Machines of Various Types.

The accompanying cuts show the new type of Farwell Molding Machines now being manufactured by the Adams Company, Dubuque, Iowa, manufacturers of milling machines, gear hobbing machines, grinding stands, foundry molding machines, pneumatic rappers, snap flasks, etc.

Fig. 1 shows the Farwell pneumatic roll-over molding machine without pattern. This machine jolts the mold as well as turning it over and drawing pattern. The combination of these features in a portable machine is new. It will be noted from the photograph that solid cast iron wheels are used, since they serve as an anvil on which mold is jolted. These wheels run upon a track imbedded in the floor, thus affording an ample foundation at small expense, and without necessitating a permanent location of the machine at one place.

FIG. 1. ROLL-OVER MACHINE STRIPPED.

FIG. 2. JOLTING THE FLASK.

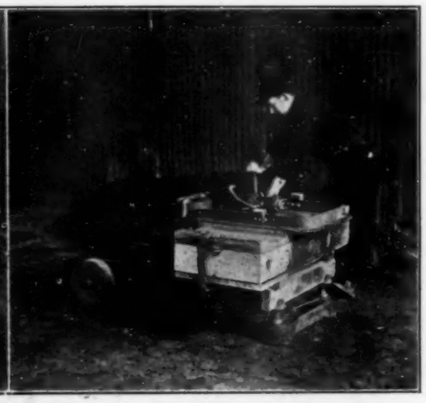


FIG. 3. THE FLASK ROLLED OVER.

The angle iron arm or table resting on the wheels carries the pattern and each side is provided with a heavy steel block A, which receives the shock when mold is jolted. The holes in this angle iron are for the purpose of attaching the pattern which is clearly shown in Fig. 6.

Fig. 2 shows the operation of jolting which is accomplished by admitting air to the cylinder and exhausting, both of which operations are performed with the same valve, enabling the molder to control the machine entirely with one hand. After jolting and striking off, the bottom board is placed in position and secured by means of the adjustable clamps which are attached to the match board. In the next operation, the molder opens the air valve again, admitting air to the cylinder and raising the mold to dead center. After passing this point, the mold is lowered on to the cross-pieces B, by allowing air to escape. This can be done as quickly or as slowly as is desired.

Fig. 3 shows the mold as it has reached this position. The four plungers C, are provided with springs which automatically equalize or adjust themselves to the irregularities of the bottom board on all four points, and as soon as mold rests upon the cross-pieces B, these plungers are locked in position by a single movement of the lever D, which is connected by links to all four plungers. This lever D may be kicked into locking position with foot. The molder now releases the clamps and is ready to draw pattern.

Fig. 4 shows the operation of drawing the pattern. The molder operates the air valve which admits air to the cylinder with his right hand, and with his left hand opens a pet cock, admitting air to the Adams pneumatic rapper, which is mounted on the framework carrying the pattern. The pattern is drawn perfectly straight to any desired height before starting to roll over, and this, combined with the pneumatic rapper and the steady air control, insures a good clean lift. It will be seen that as cylinder E is raised by the air pressure within, the pattern will be drawn straight until the yoke F strikes the pin G, when the yoke must stop, making a fulcrum at the pin H. Fig. 5 shows how the machine operates from this point on, the pattern describing an arc.

FIG. 4. DRAWING THE PATTERN.

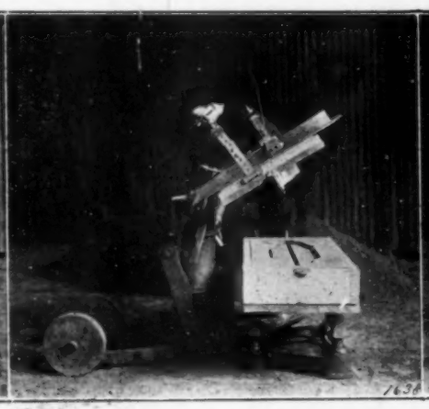


FIG. 5. FINISHING THE "DRAW."

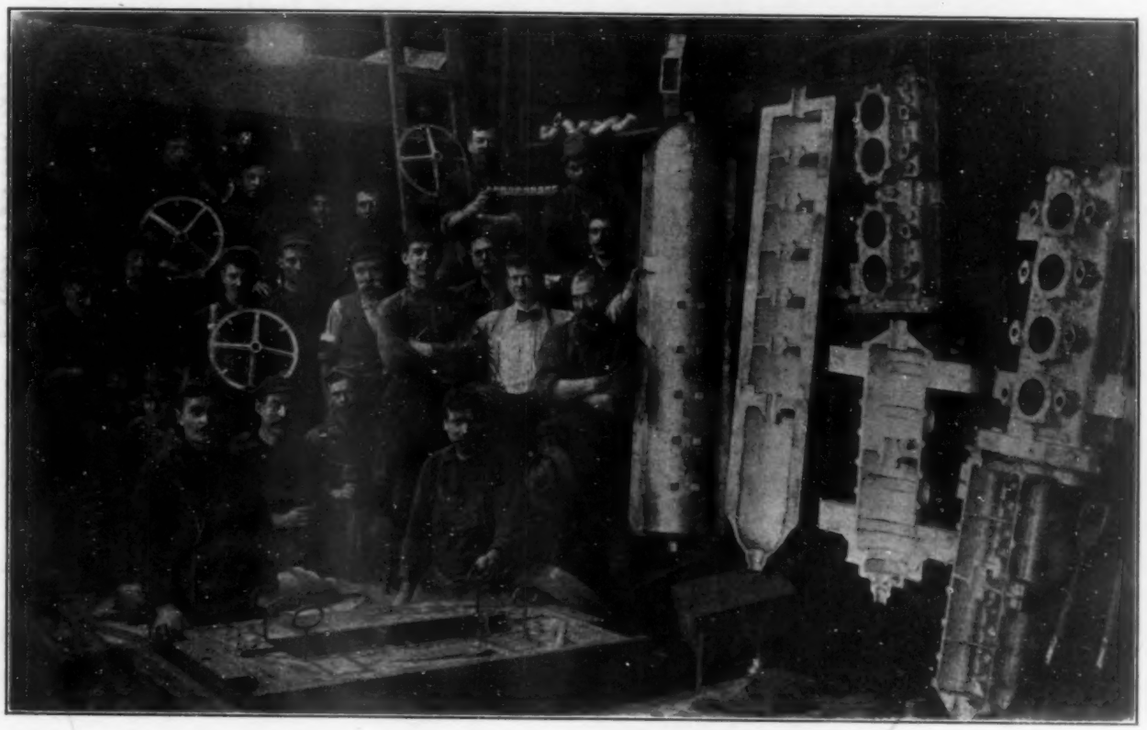
FIG. 6. THE MOLD COMPLETED.

Fig. 6 shows the pattern as it has just passed dead center, rolling back to its original position, ready to receive new flask and start on another mold. The special features of the Farwell pneumatic roll-over molding machine are its great simplicity, the method of instantly clamping the plungers so that the mold rests evenly thereon, the elimination of expensive concrete foundations, portability, the hinged clamps, easy control, the use of the pneumatic rapper in drawing the pattern and the fact that skilled labor is not necessary for successful operation.

THE QUEENSBOROUGH BRASS AND BRONZE FOUNDRY.

Over in Astoria, on Long Island, is a small foundry with a big name, not only in the number of letters required to spell it, but also in the quality and quantity of the products turned out. No job seems to be too big or complicated for the energetic men operating this foundry to tackle. Starting only two years ago with the modest capital of $3,000, this foundry has made such rapid strides that it is now to be reckoned with as a formidable producer of copper, brass, bronze of all kinds, including manganese and phosphor, and aluminum castings of all sorts and descriptions.

We reproduce a photograph taken of the working end of this foundry, showing the character of the products and also the producers. Some of the notable productions of this foundry are automobile, motor boat gear and crank cases of aluminum, several tons of which are shipped each week; also castings of complicated design of manganese and other special bronze. The metal parts for the clock in the Metropolitan Life Insurance Building tower on Twenty-third street and Fourth avenue, New York, were made by this foundry. The shaft of the minute hand, for instance, is of manganese bronze and weighs 304 pounds, and is operated by gears weighing 84 pounds, cast of the same metal. In the foreground of the photograph is shown a motor boat crank case of aluminum, seven feet long, adapted for six cylinders, and weighs 150 pounds. The officers and owners of this hustling and enterprising foundry are Thomas McEntire, an experienced foundryman, president; A. H. Dale, a hustler for business, treasurer and general manager, and George Miller, also a foundryman of wide experience, secretary. This foundry is located at 184 Broadway, Astoria, which is readily accessible from New York or Brooklyn, and where visitors will always be welcomed by the proprietors.



THE QUEENSBOROUGH BRASS AND BRONZE FOUNDRY AND THE MEN THAT MAKE IT GO.

PAASCHE PNEUMATIC PAINT BRUSH.

The Paasche Air Brush Company, Chicago, Illinois, manufacturers of air brushes, sprayers, foot pumps, automatic electric air-pressure outfits, easels, artists' specialties, are introducing their new Paasche Pneumatic Paint Brush as shown in cut. This brush is claimed to be the greatest labor-saving device of modern times for painting and finishing any manufactured article, from the smallest to the largest. It is instantly adjustable to distribute pigments of any consistency whatsoever and produce from a line to a broad spray, three to four inches in width. It furnishes the most perfect finish, as it breathes the pigments over the work with the force of wind and leaves them there in the most natural way conceivable.

This brush can be operated with air pressure, from twenty-five to fifty pounds or more, and will work with ordinary house paints, lacquers, varnishes, bronzes, enamels, japan colors and anything in liquid form, on surfaces or materials of any kind whatsoever, like wood, stone, metal in any form or shape, cloth, etc., without clogging, leaving the most perfect finish obtainable, with a saving of from twenty to sixty per cent in time. The paint bottles are detachable, suitable for instant changing from one pigment to the other without having to do any cleaning.

Detailed information for special requirements upon request.

THE PAASCHE PNEUMATIC PAINT BRUSH.

Associations and Societies

DIRECTORY OF AND REPORTS OF THE PROCEEDINGS OF THE METAL TRADES ORGANIZATIONS.

NATIONAL ELECTROPLATERS' ASSOCIATION OF THE UNITED STATES AND CANADA.

President, Charles H. Proctor, Arlington, N. J.; Treasurer, H. H. Reama, New York, N. Y.; Corresponding and Financial Secretary, Geo. B. Hogaboom; Recording Secretary, Royal S. Clark. All correspondence should be addressed to the Corresponding Secretary, Geo. B. Hogaboom, 656 Hunterdon Ave., Newark, N. J. The objects of the Association are to promote the dissemination of knowledge concerning the art of electro-deposition of metals in all its branches. Meets the first Friday of June, July, August and September, 8 p. m.,

NEWLY ELECTED OFFICERS OF THE ASSOCIATION.

CHARLES H. PROCTOR, President.

GEORGE B. HOGABOOM, Corresponding and Financial Secretary.

ROYAL S. CLARK, Recording Secretary.

HERMAN H. REAMA, Treasurer.

at the Hotel Chelsea, 222 West Twenty-third street, New York City.

The fifteenth regular meeting, which was also the annual convention of the National Electroplaters' Association, was called to order by the President, Charles H. Proctor, at the Hotel Chelsea, New York City, on May 7, at 8:20 p. m. Following the reading and approval of the minutes of the last meeting, the old officers of the Association retired with the unanimous thanks of the Society, and the newly elected officers as given in the April issue of THE METAL INDUSTRY were installed. A printing committee composed of Messrs. Dimes (chairman), Havens and Straub was appointed to attend to the printing of pamphlets, etc., of the Association. A committee was also appointed with power to act in the matter of holding a "smoker" in the near future. This committee is composed of Messrs. Schneider (chairman), Sliter, Baxter, Hoffman and Fannon. A notice of the date and place of the "smoker" will be sent to members in due time. A committee consisting of the president, the two secretaries and the librarian was appointed to look into the publication of "transactions." After the routine business was finished, the following papers were read: "A Simple Method of Anode Distribution," by Charles H. Proctor; an exhibition and description of "Galvanit," by P. S. Brown; "An Acid Copper Addition Agent," by A. Hoffman; "Uses of the Reverse Current," by Geo. Hogaboom; "Heavy Plate of Copper on Steel," by F. C. Clement; "Pleasures of the Electroplater's Art," by R. A. Clark, and "An Appeal for Harmony," by J. A. Stremel. These papers will be published shortly as a part of transactions and sent to members. It was decided to hold the meetings in June, July, August and September on the first Friday of each month instead of Saturday.

THE FOUNDRY AND MANUFACTURERS' SUPPLY ASSOCIATION.

President, F. N. Perkins, Freeport, Ill.; Secretary, C. E. Hoyt, Lewis Institute, Chicago, Ill.; Treasurer, J. S. McCormick, J. S. McCormick Co., Pittsburg, Pa. All correspondence should be addressed to the Secretary, C. E. Hoyt, Lewis Institute, Chicago, Ill. The objects of the Association are for the commercial and technical education of iron and metal industries by co-operating with all foundry and manufacturing interests in making an annual exhibit of supplies and equipments in conjunction with the meeting of the American Foundrymen's Association. The next exhibit and convention will be held in Detroit, Mich., June 6-10, 1910.

AMERICAN BRASS FOUNDERS' ASSOCIATION.

President, Wm. R. Webster, Bridgeport, Conn.; Secretary and Treasurer, W. M. Corse. All correspondence should be addressed to the Secretary, W. M. Corse, 1155 Sycamore street, Buffalo, N. Y. The objects of the Association are for the educational welfare of the metal industry. Annual convention with the American Foundrymen's Association in a succession of cities, as invited. The next convention will be held in Detroit, Mich., June, 1910.

The energies of these societies are now being directed towards the coming convention. Further particulars are to be found in the opening article in this issue of THE METAL INDUSTRY concerning the convention.

ITEMS OF INTEREST TO THE INDIVIDUAL.

C. M. Dally, of 29 Broadway, New York City, received recently from the Czar of Russia a handsome cigarette case in remembrance of his services some seventeen years ago in introducing in Russia and England the Harvey armor plate. This armor plate was introduced very soon after its official adoption by the United States Government. Mr. Dally is known to METAL INDUSTRY readers as the American agent of the Bates & Peard Annealing Furnace Company, manufacturers of bright annealing furnaces. Besides this connection Mr. Dally is a dealer in war material and secretary of the Churchward International Steel Company, owners of the patents covering processes for the manufacturing of modern armor plate and ordnance. He is also president and director of several other companies which build patented inventions for military and naval purposes. He is in close touch with the principal European Governments. Some five years ago he received unusual honors from the British Government before whom he had previously submitted for adoption the Yankee (Lee) military magazine rifle in competition with others from all over the world, and succeeded in securing its adoption. Mr. Dally's business relations with the foreign governments has made him a great traveler, and he celebrated last year his fiftieth crossing of the Atlantic.

R. A. Brown, for the past sixteen years associated with the Joseph Dixon Crucible Company at Jersey City, and known throughout the world as the "Oriental Man," has severed his connection with that house, and is now associated with the Jonathan Bartley Crucible Company, of Trenton, New Jersey. At the present time, Mr. Brown is on his way to South Africa, and will make an extended trip covering all parts of the globe.

Lieutenant Colonel L. D. Conley, secretary of the Conley Tin Foil Company, 541 West 25th street, New York, was recently elected to the colonelcy of the 69th Regiment. Col. Conley has been connected with the military of New York City since 1900, when he entered the National Guard as a second lieutenant in the 9th Regiment.

William G. Kelleaway, who was formerly in charge of the brass foundry of Wm. M. Crane Company, hub foundry plant, Ossining, N. Y., has accepted a position as foundry foreman with the Pratt & Cady Company, of Hartford, Conn.

J. R. Gordon, formerly superintendent of the F. H. Lovell Company, Arlington, N. J., has become associated with Mr. Ward, of Brooklyn, under the name of Gordon and Ward, manufacturers of metal specialties, Vanderbilt street, Brooklyn, N. Y.

W. R. Dean has resigned his position as superintendent with the Dean-Allen Manufacturing Company, South Portland, Me., and has accepted a position as general foundry foreman of the Lumen Bearing Company, Buffalo, N. Y.

Edwin D. Paige, treasurer of the Paige Retort and Crucible Company, Taunton, Mass., has been confined to his home for some time on account of sickness. Pending his recovery G. M. Conner is looking after the business.

Charles S. Maddock has been elected treasurer of the Jonathan Bartley Crucible Company, Trenton, N. J., in place of the late A. M. Maddock, Sr., and A. M. Maddock, Jr., succeeds his father as a director of the company.

Joseph J. Wilson, formerly superintendent of the foundry department of the Cadillac Motor Company, Detroit, Mich., has become general superintendent of the foundries of the General Motor Company, Detroit.

W. E. Gifford, who has been representing the Dow Chemical Manufacturing Company, of Mansfield, Ohio, in the eastern territory for several years past, has been assigned to the management of their Bridgeport, Conn., branch. The Dow Company are manufacturers of platers' chemicals and supplies.

Neil J. Frederickson, foreman of the brass foundry of the Kelly & Jones Company, Pittsburg, Pa., has gone to fill a similar position with the Detroit Lubricator Company, of Detroit, Mich.

Henry W. Russell, of the Lumen Bearing Company, was recently elected president of the Niagara Frontier Purchasing Agents' Association of Buffalo.

J. Burke has accepted a position as foreman plater with the New Jersey Nickel Plating Works of Jersey City, N. J.

DEATHS

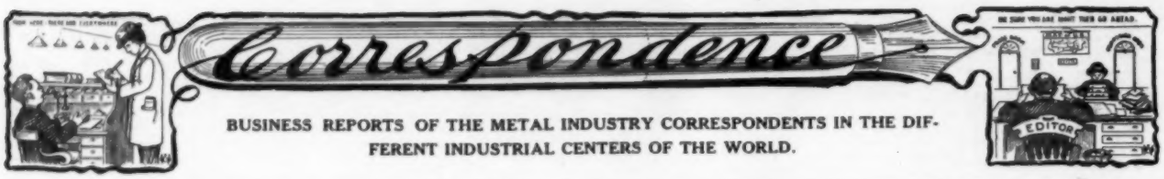
George N. Pierce, founder of the Pierce Arrow Motor Car Company, died recently from an attack of heart failure in Buffalo. Mr. Pierce began his career as a member of the firm of Heintz, Pierce and Munschauser, organized in 1872 to manufacture bird cages and refrigerators. From this he went into the manufacture of bicycles and later in the manufacturing of automobiles. Since his retirement from active business two years ago, Mr. Pierce has lived by turns on a ranch in the West, at his summer home near Sturgeon Point, and at the Lenox Hotel, Buffalo, where his death occurred. He was 64 years old, but appeared to be hale and active. He was a member of the North Presbyterian Church and of the Chamber of Commerce and other Buffalo organizations. He was born in Friendsville, N. Y.

John H. Converse, head of the Baldwin Locomotive Works, Philadelphia, Pa., died at his country home on May 3. He was one of the best known philanthropists in the country, and as the executive head of the Baldwin Locomotive Works helped build up one of the very largest manufacturing plants in the world.

Henry C. Forrest, president of the Tacony Steel Company, Tacony, Pa., the concern that built the aluminum tower on City Hall, Philadelphia, died April 2 in Philadelphia. The tower built under the personal supervision of Mr. Forrest was the first important aluminum structure erected in America.

THE USES OF BISMUTH.

The Revista Minera, of Madrid, publishes a short article, entitled, "What is Bismuth Used For?" This reads as follows: "Large quantities of bismuth compounds are used in medicines and cosmetics. The metal is useful only in alloys, to which it imparts two common characteristics, they melt at a very low temperature and they expand in cooling. The alloys are used in automatic fire extinguishers, fusible plugs in steam systems, electric fuses, soft solders, dental work and baths for tempering steel. Some of the more common alloys are Newton's, containing 20 parts bismuth, 50 parts lead and 30 parts tin; Rose's, with 50 bismuth, 25 lead and 25 tin; Woods's, with 50 bismuth, 25 lead, 12.5 tin and 12.5 cadmium; and Lipowitz's, with 50 bismuth, 27 lead, 4 tin and 3 cadmium. The first two melt as 200 degs. Fahr., the third at 160, and the last at 140. The refining and sale of bismuth are practically monopolized by three concerns.



BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS IN THE DIFFERENT INDUSTRIAL CENTERS OF THE WORLD.

WATERBURY, CONN.

MAY 9, 1910.

Booming fairly expresses the conditions hereabouts as regards the brass industry and kindred metal manufacturing business. Freight records here show that there is more incoming raw material and outgoing finished product being handled than the average of last year, and the April records when completed are expected to establish a new high water mark.

There is a scarcity here of skilled labor, so great is the rush for work, and it happens that there is a much greater scarcity of skilled machinists in Detroit and some of the other Western centers. The result is that flattering offers of high wages and permanent positions are being made to Waterbury employees and already a few have been secured from this part of the State. Detroit's automobile industries are said to be responsible for this, so prosperous are they this year.

There have been a few changes among officials in some of the large concerns hereabouts of late. A few days ago Clifford J. Hackett, who has been private secretary to Charles F. Brooker, president of the American Brass Company, for some time, left for Kenosha, Wis., to assume the position of chief representative of the company in that section. It is stated that he has been made secretary of the Kenosha company and will reside there permanently. Mr. Hackett, whose home is here, has been located generally in New York or Ansonia, during business hours, but is well known in the brass business and has made rapid advancement since he has been connected with the American Brass Company, his first position having been an humble one.

Although it is officially denied that C. W. Henger, who was their Chicago representative, has succeeded the late Richard Ashworth as treasurer of the Waterbury Manufacturing company, he is at work for the company here and is understood to have taken on some of the duties of the treasurer's office. Harry S. Chase is himself acting as treasurer, it is understood, Mr. Ashworth's office not having been filled by the directors as yet. No official information is obtainable at this writing as to the changes in the Chicago office.

The Atlas Machine Company and the Morden Manufacturing Company have recently removed to a new building on Manhan street, just beyond the new Union depot, where they have considerably more floor space and capacity for all departments. Both of these concerns have long been cramped on account of their rapid growth, although they are still among the "infants" of Waterbury's industries.

Building is progressing fast in the Waterbury Manufacturing Company's and the Scovill Manufacturing Company's plants, and some new additions are soon to be started, although some of those recently announced are not completed, at both of these shops. This year's business has been so strong and steady that every inch of additional space is being filled as rapidly as it is ready.—F. B. F.

PROVIDENCE, R. I.

MAY 9, 1910.

The manufacturing jewelers of this section are on the anxious seat just now, waiting to see whether the next few weeks will justify their hopes for substantial orders for the early fall trade. A few buyers have already come to the city from Western points, but the full tide of buying has not yet set in.

The season has reached that point where the samples for early fall goods have been turned out by the factories and the salesmen are on the road. They have not yet been on the road long enough to determine what sort of a trade the coming months are likely to see. The few buyers who have thus far registered at the local hotels have placed orders which indicate that the present season will be up to the standard.

Although many complaints were heard from manufacturers during the winter months as to the dullness of trade, a close investigation seems to show that business was about up to the standard. Jewelry manufacturers have a way of deprecating the conditions of the trade from year to year, and there is probably as much or more meaningless complaining made in connection with the conduct of the industry as is to be found in any line throughout the entire manufacturing world. When sifted down, however, conditions are almost uniformly found to be better than painted.

The jewelers have shown considerable interest in the plan which is pending before the General Assembly to establish a corporation tax in this State. There was considerable displeasure among the manufacturers when the federal corporation tax was levied and the proposition to have a State tax also has not met with favor. The proposed rate is so low, however, that little open opposition to the measure has been made, the corporations believing that it would be bad policy to fight the imposition of a light tax on property which is now practically free from taxation.

Rhode Island jewelrs are among the victims of an alleged swindle, in which property approximating $2,000,000 has been lost. The United States authorities have already 12 arrests in connection with the case, and 10 of the defendants have been placed under bail aggregating about $100,000. The defendants are all located in the southern States and are alleged to have had their headquarters at Montgomery, Ala.

The swindlers are alleged to have ordered goods from manufacturing concerns and then to have gone into fake bankruptcy or to have had suspicious fires before the goods were paid for. It is asserted by federal detectives that Providence jewelry, which was declared by the defendants to have been burned up, was found for sale in other stores under the control of the defendants. The defendants were connected with concerns known as the City Jewelry Company, the Union Mercantile Company and the J. H. Shreve Company. The first two were located at Montgomery and the other at Greenville, Ala. Harry Cutler of this city, a member of the Cutler Jewelry Company, manufacturing jewelers, is one of a committee of three which has charge of the matter for the New York Jewelers' Board of Trade. This committee enlisted the attention of the federal authorities in the affair.

It is reported that a large addition is to be built to the G. K. Webster Company jewelry plant, North Attleboro, and that plans are now under way for the commencement of the work. Business is said to be exceptionally good with this concern, and it is to meet the demands for trade that the addition is to be erected. Overtime work has been necessary of late. About 200 hands are employed now. This number will be increased as soon as the addition is completed.

James O. Bowers, who for twenty years has been engineer of the jewelry plant of George H. Fuller & Sons, Pawtucket, was presented by his firm with $1,000 in cash and informed that whenever he desired he migth retire and act as foreman of the engine room. He is 78 years old.

The Star Company, of Providence, manufacturing jewelers, has filed articles of incorporation with the Secretary of State. The incorporators are Charles E. Smith, Charles H. Bowers and Walter M. Towne. The capital stock is $25,000.—E. S. M.

BRIDGEPORT, CONN.

MAY 9, 1910.

Within a few weeks the new plant of the Whiting Manufacturing Company, silversmiths, situated on Bishop avenue, will be in full operation, and there will have been added to the many

industries of the city of Bridgeport, one that will undoubtedly reach a much larger growth than it has attained up to the present time, because of better facilities and a better labor market, reasons which caused the company to leave its old plant at Fourth and Lafayette streets, New York, after being there for over thirty years.

At present about two-thirds of the plant has been moved to the new factory, and as soon as possible the balance of the equipment will be shipped here. Although the company is in the course of moving, and has been for some time, the turning out of goods has been going on just the same, despite the great inconvenience of doing business. The work is started in the New York factory, and when it reaches one of its crude stages, is sent here to be finished and shipped to customers.

The factory has a capacity of 500 hands. It will start with a force of about 350 hands, and will build up in the course of time. Most of the positions which can be offered by the company call for skilled workmen. Only a few women are employed, and these are mostly in the finishing and case department. The men, because of their skill and the nature of the work done, command high wages, and the coming of the plant will mean an increase of skilled workmen, whom it is believed will build homes here before long. The buildings without their mechanical equipment mean an investment of about $75,000. The Whiting company was in Attleboro, Mass., formerly. About thirty years ago it moved to New York City.

The officers of the company are: President, H. H. Hamilton; vice-president, Frank Osborne; secretary and treasurer, George E. Wells. Mr. Hamilton has already made his home in Bridgeport. The plant is in charge of Robert W. Higgins as superintendent.

With all affirmations and denials of the change of ownership of the Fairfield Aluminum Company, it can be stated authoritatively that a change has been made, and the local concern is now known as the Aluminum Castings Company, becoming one of the branch foundries of the Cleveland concern. It is the intention of the new corporation to double the size of the plant and add to the force of molders, bringing the total of employees up to 200.

President Frank A. Wilmot, of the American Tube and Stamping Company, has bought the property of the Bridgeport Copper Company in the west end of the city, which covers a large area, and is one of the best manufacturing sites in the city. The plant of the copper company has stood unused for years, since the copper trust put the Bridgeport concern out of business. A part of the plant has been used for some years as a hot rolling mill by the American Tube and Stamping Company, and it is understood that Mr. Wilmot will continue to rent this portion to the company. The amount paid for the property is not known, but it is valued on the tax list of the city for $45,000.

Work upon the addition to the factory of the Locomobile Company, which was begun a couple of weeks ago, is making good progress. The foundations are complete, and a start has been made upon the brick walls of the building. The Torrington Building Company have the contract. The addition will mean the employment of many more hands, and it is said will increase the output of cars about 300 per year.

The Warner Silver Company, of this city, has filed notice of its incorporation with capital of $5,000. Louis Weidlick, Harold C. Weidlick and Arthur M. Comley are the incorporators.

There has been some delay in getting the machinery for the new trade school, and it will be several weeks before it will be open and the work of this school commenced.—E. L. H.

PHILADELPHIA, PA.

MAY 9, 1910.

Concerted effort on the part of ten or a dozen well-known men headed by Rabbi Krauskopf has resulted in the formation of the Patriotic Society of Philadelphia, which has for its object the upbuilding of a strong sentiment of social, political and commercial loyalty. For some singular reason none of the newspapers were invited to participate in the movement, and as a result it has fallen flat and a great agency for good has been lost. Many organizations allied with the metal trades were invited by circular letter to co-operate, but as yet none has taken active part.

The Metal Manufacturers' Association enjoyed a formal dinner at the Bellevue-Stratford on April 26. None of the orators discussed anything relating even remotely to the metal industry. The gentlemen were there to enjoy themselves and not to hear "shop-talk." Edward L. Langworthy, president of the organization presided.

The creditors of the Central Foundry Company have been asked to help raise $700,000 to put the concern on its feet.

A. S. Martin, of No. 2031 Germantown avenue, is advertising his intended retirement from the jewelry business. He handled quantities of old gold as well as a large stock of watches and jewelry.

The Merchants' and Manufacturers' Association is planning a business building trip through the Cumberland Valley. The metal section will be represented.

The Sterling Bronze Company, of No. 1513 Walnut street, has moved to No. 111 West 25th street, New York.

The plant of the Phosphor Bronze Company at 22d street and Washington avenue will be very greatly enlarged.

The Baldwin Locomotive Works has booked an order for 110 locomotives.—C. H. C.

BUFFALO, N. Y.

MAY 9, 1910.

The Model Brass Foundry of Buffalo, N. Y., reports that business is on the increase this year. One of the officers of the company stated that there was a distinct increase this year over the same period last year in all lines of the metal industry.

W. H. Corse, works manager of the Lumen Bearing Company of Buffalo, said that his foundry was very busy, employing a large force of men and often working overtime. The new laboratory which the Lumen Bearing Company recently built is proving very satisfactory. Many practical tests that have materially improved the products of the company have already been made. The Lumen Bearing Company reports that as a result of a trip to Detroit of the business manager of the firm, William H. Barr, a large increase in the business of the firm has resulted. The negotiations which Mr. Barr conducted with several large automobile manufacturers were successfully terminated, and the Lumen Bearing Company will now furnish red brass bearings for a number of the biggest automobile manufacturers in the country.

W. P. Poole, who formerly was manager of the Aluminum Casting Company's branch at Buffalo, has been promoted to the position of manager of the company's Detroit plant. This is a recognition of Mr. Poole's ability and success, and is a distinct promotion. F. E. Ganderton, who was manager of the Aluminum Casting Company's plant at New Kensington, Pa., has taken up his duties in Buffalo as manager of the Buffalo branch. Mr. Ganderton is well qualified for his new position, and it is also a promotion for him.

The new plant of the Aluminum Casting Company that is being erected in Buffalo will soon be completed. The contractors are putting the finishing touches to the structure and its interior, and when it is completed it will be one of the most up-to-date buildings of its kind in the country. When this building is opened the company will employ a large additional number of men. The company's business at Buffalo is in a very healthy state, but it is expected that with the plant it will even do better.

The Pierce-Arrow Motor Car Company, of Buffalo, one of the largest automobile concerns in the country, recently issued an order to the effect that all metal castings that are not passed by the inspectors in the inspectors' room of the plant must be broken up before they are sold as scrap. It has recently developed that certain persons were buying these parts and selling them for the perfect article. Pierce-Arrow quality will not permit a casting to be even a thousandth of an inch out of the way, and any casting that is even so small a fraction out of measurement is instantly condemned. The persons who did this of course were not so careful and a fairly good article could be sold to those persons that did not know the real truth.

Several travelers representing jewelry firms recently visited Buffalo. The callers included the following: C. W. Hickok, Graff, Washburne & Dunn; Fred T. Barry, Louis Stern & Co.; M. S. Olin, A. & Z. Chain Co.; Herman Winter, Longines; Thos. H. Ryland, American Watch Case Co.; W. H. Berth, Wm. B. Durgin Co.; Geo. A. Jochum, C. Cornehlsen; Henry C.

Maybaum, Charles Adler's Sons; Wm. B. Peck, Crossman Company; W. G. Moland, Sansbury & Nellis; Ben. Levy, Wm. I. Rosenfeld; E. B. Downs, Hayden W. Wheeler & Company; William Roman, Manasseh, Levy & Company; Chas. T. Dougherty, Osmas-Dougherty Company; Jos. J. Sideman, Redlich & Company; Jos. S. Frank, Sussfeld, Lorsch & Company; L. Kramer, Borrelli & Vitelli; Frank L. Wood, Ludwig Nissen & Company; Chas. E. Lochner, The Hayes Brothers Company; W. R. Shute, Day, Clark & Company; G. G. Tibbals, International Silver Company; Mr. Hassenplug, Aiken-Lambert Company.

E. A. Eisele, of the manufacturing jewelry firm of King & Eisele, of Buffalo, accompanied the members of the Wholesale Merchants' Board of the Chamber of Commerce and Manufacturers' Club on their four-day excursion to cities in the immediate neighborhood of Buffalo to boom Buffalo-made products. The Wholesale Merchants' Board is composed of many wholesale merchants and manufacturers in the city. It is planned to have more of the "Boost Buffalo" trips in the near future.—J. A. M.

CLEVELAND, OHIO.

MAY 9, 1910.

Business in the metal line is brisk in this territory at present. The various brass, copper and bronze factories are being rushed to capacity, while the dozen odd automobile factories are finding difficulty in keeping up with the rush of orders.

May day has come and there have been no serious labor disputes in Cleveland and none affecting the metal industry. In several instances wages of molders and of workmen in other branches of the trade have been voluntarily raised by the management. This industrial peace means much just now, as after a two or three year slack period the proprietors and managers are anxious to see the year 1910 make an unusually good showing.

The aluminum factories here all report an exceedingly busy month. Aluminum castings are coming into favor for a large number of purposes, particularly in connection with the construction of automobiles and aeroplanes. The auto industry makes a strong demand for castings of various kind and orders are coming in from many points to the local firms.

That the brass business must be in a flourishing condition is indicated by the purchase during the past week by Morris H. and Joseph H. Glauber, of the Glauber Brass Manufacturing Company of a fine lot on Euclid avenue, opposite East 17th street. It is now occupied as an apartment house, but the old building is to be wrecked shortly and an eight-story tile front office and store building erected on the property, which cost the Glaubers in the neighborhood of $120,000.

On a petition of creditors the Ohio Brass and Iron Company was placed in the hands of a receiver during the past month in the United States District Court. Irwin N. Loeser was appointed to take charge of the company's business. Creditors declare that the trouble is due to weak management.

The plumbing fixture manufacturers report a good demand for stock. The building industry this year seems to be in excellent condition in all parts of the country, and consequently this line of business expects to reap a big harvest. The plants here are working to capacity, some difficulty being found in securing skilled laborers.

Director of Public Service Lea has been asked by the city council to look into the question of designing and erecting a handsome bronze drinking fountain in the northwest section of the Public Square. It is proposed to defray the expense with funds from the waterworks department, which is making a big profit for the city each year.

Sculptor Karl Bitter, of New York, has been directed to proceed with the casting of the bronze statute of Alexander Hamilton, to be placed in front of the new $4,000,000 county courthouse. The statue is one of four large seated figures which will flank the north and south entrances to the monumental building.

Architect Charles F. Schweinfurth, in charge of the decorative features of the new courthouse, has been directed by the building commission to furnish estimates of the cost of bronze doors for the building. There are eight of these, together with inside swinging doors, which will be of bronze frames and plate glass. If the estimates are reasonable it is probable that the commission will order the change from wood to bronze. Much expensive bronze grill work is to go inside of the structure as well.—McM.

DETROIT, MICH.

May 9, 1910.

The usual report that business is good again comes from the Detroit brass manufacturers in reference to the month of April just closed. Manufacturers in this line are looking forward now to two important events that will take place in Detroit within the next few weeks. The first is the annual convention of the American Foundrymen's Association which opens on June 6 and continues until June 10. The other is the local Industrial exposition beginning on June 22 and continuing until July 5. At the Industrial exposition every manufacturer in Detroit, including the majority of the brass concerns, will make a great display of products in specially erected structures on the river front, in the vicinity of the Wayne hotel. These latter exhibitors will also make displays at the Michigan State Fair Grounds during the Foundrymen's convention.

The Detroit-Dearborn Motor Car Company has recently increased its capital stock from $50,000 to $100,000, and the new building being constructed in connection with its present plant will permit of doubling its capacity. The Detroit plant will be operated in connection with the one at Plattsburg, N. Y., which turns out 600 cars per annum.

Plans are now under way for the erection of the new plant of the Lozier Motor Company. Sixty-five acres of ground in the northern part of the city at the junction of Mack avenue and the new belt line have recently been purchased. All the buildings will be of reinforced concrete construction. The output of this plant will be 1,200 cars a year.

The Anhut Motor Car Company has recently increased its capital stock from $150,000 to $300,000. It has also absorbed the Chatham Motor Company, of Chatham, Ont., and will operate that plant with a view of entering extensively into the Canadian field.

The Gray Motor Company is contemplating, it is said, a move to Fairview, a suburb of Detroit. This company now employs 300 hands, and the probability is that the number will be materially increased at the new plant.

In referring to the automobile industry it is interesting to state at this point that previous to Jan. 1, 1909, there were twelve automobile manufacturing establishments in Detroit with a capitalization of $7,865,000. During the year 1909 twenty-one new companies began the manufacture of automobiles in the city. Many of these are small, but all are prosperous and planning extensions.

The Ireland & Matthews Manufacturing Company, located at the foot of Iron street, is erecting a two-story brick structure, providing 12,000 feet of extra floor space. One of the newest presses is a fifty-ton machine for automobile stamping exclusively. The making of spun, stamping and drawn metal goods is of such a character, and orders are coming in so plentifully as to necessitate the factory running overtime. About six hundred men are employed, and when the new building is complete one hundred more will be taken on.

The Detroit Radiator Company on Jefferson avenue East, has just completed a one-story brick structure, to which will be added a second story within a reasonable time. This firm manufactures radiators for automobiles, and is at present filling orders for 300 aeroplane radiators.

The Fairview Foundry Company is one of the latest concerns that will begin operations in the Detroit suburb within a short time. The president is F. L. Bromley; vice-president, J. W. Thompson; secretary and treasurer, C. A. Pfeefer. The plant is new throughout and equipped with the most modern machinery for the casting of gray iron, brass and aluminum. The foundry consists of two separate buildings, one for brass and aluminum and one for casting iron. In this way all confusion of materials and the possibility of poor work are eliminated. This plant will make all the castings for the Chalmers Motor Car Company and will also specialize in marine gas engine castings.—F. J. H.

TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 99 JOHN STREET, NEW YORK

Additional Trade News will be found under "Correspondence."

John H. Fraley has opened a brass foundry at 1030 West King street, York, Pa.

The Republic Metalware Company, Buffalo, N. Y., has filed plans for a two-story brick storehouse, costing $2,500, at 85 Tennessee street, Buffalo.

The Manville Brothers Company, machinery builders of Waterbury, Conn., report that they have six months' work ahead on orders for power press and wire machinery.

The old firm of Henderson Brothers, Waterbury, Conn., builders of tumbling barrels, report that they are crowded with work. They have under way some new designs.

It is reported that the Turner Construction Company, of Buffalo and New York, will build a mammoth factory at Niagara Falls, for the Niagara Falls Aluminum Company of America. The dimensions will be 150 feet by 250 feet.

Manufacturers and seller of metals, machinery and supplies will be interested in reading the number of inquiries on advertising page 43 of this issue. There are fourteen inquiries for metals, machinery and supplies.

The citizens of Celeron, N. Y., are considering an offer to buy three acres of land there and give it to a syndicate that is planning for the manufacture of automobile wheels. The promoters are Lathrop Todd, Hudson A. Shaver, George Thompson and George Gross.

The Pilling Brass Company, of Waterbury, Conn., have increased the sizes of sheet that they roll from widths of six inches to eight inches. Since their plant was started three years ago they have doubled their equipment and output. Their specialty is thin brass.

The Knickerbocker Foundry Company, 348 W 12th street, New York, announce that they have unexcelled facilities for making gold, silver, bronze and aluminum castings. Their specialty is automobile castings. Louis Schanz is president of the company and A. P. Chavent is vice-president and secretary.

The Ross-Tacony Crucible Company announce that William C. Yenger has been placed in charge of their New York office, 1171 Fifth Avenue Building, as their Eastern representative, and will look after the interests of the trade throughout New York State, Northern New Jersey and New England States.

The Deforrest Wireless Telegraph Company, of Newark, New Jersey, have installed a plating plant and are copper plating their condensers, which are glass tubes 1½" in diameter and 18" long. These tubes are plated both inside and out. The first metallic coating is given by the pouring process, or as it is commonly known, the "white or mirror" finish.

The Aluminum Castings Company, with branches at Detroit, Cleveland, Buffalo and New Kensington, Pa., have acquired the interests of F. B. Perry in the Fairfield Aluminum Company, Fairfield, Conn. It is reported that it is the intention of the new corporation to double the size of the Fairfield plant, and add about 200 men to the moulding force.

The Dixie Foundry & Supply Company, manufacturers' agents, have located at the corner of Fort and Carver streets, Chattanooga, Tennessee, where a full line of foundry facings and supplies and platers' and polishers' supplies is carried. O. L. Gard is the resident manager, and this firm is also the selling agent for F. B. Stevens, of Detroit, Michigan.

The Cramer & Kiely brass foundry at Syracuse, New York, has reconstructed the old West Shore round house in Burnet avenue, and equipped it with tools and machines for the casting and working of metals. This concern makes brass, bronze and aluminum castings, and while starting with a small force expects to increase as rapidly as business will warrant.

The C. L. Constant Company, of 42 New street, New York City, chemical and mining engineers, has changed its name to the Constant-Herzig Company, of which Charles S. Herzig has become president and will have charge of the engineering department. C. L. Constant is secretary and treasurer and will have charge of the chemical laboratories. W. Murdock Wiley remains as vice-president of the company.

The Imperial Brass Manufacturing Company, manufacturers of brass specialties, Chicago, Illinois, have bought a plot of ground 100 x 125 feet, as the northwest corner of Center avenue and Harrison street, Chicago. The company will build a concrete building five stories high, which will be used for a foundry and factory where over 200 men will be employed in producing brass bronze and aluminum goods, consisting principally of automobile parts. It is expected that the building will be ready in the early fall.

Proposals will be received at the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., until 10 o'clock a. m., May 24, 1910, and publicly opened immediately thereafter, to furnish at the navy yard, Mare Island, Cal., etc., a quantity of naval supplies, as follows: Sch. 2423: Sheet zinc. Applications for proposals should designate the schedule desired by number. Blank proposals will be furnished upon application to the navy pay office, San Francisco, Cal., or to the Bureau. E. B. Rogers, Paymaster-General, U. S. N.

The Boston Belting Company, Boston, Mass., manufacturers of belting, hose, packing, and mechanical rubber goods of every description, have ceased to act as the western agents for the Jewell Belting Company of Chicago. They have now opened their own store at 177 Lake street, Chicago, with Mr. M. S. Curwen, manager of sales, in charge of the same. They will carry in Chicago a complete stock of rubber belting, hose, packings and other mechanical rubber goods, as in the past, and will be glad to receive the attention of their former patrons.

The Kelly & Jones Company, Greensburg, Pa., manufacturers of plumbers' goods, brass fittings, and valves, etc., are making an addition to their brass department of a new concrete building, 440 feet long, 65 feet wide and four stories high, the entire top floor to be devoted to their brass foundry. This large addition is being erected entirely by their own employees, under the supervision of F. E. Johnson, superintendent, and W. W. Jeffries is in charge of the construction work.

The Atlas Machine Company, of Waterbury, Conn., will move on June first from their present address, 31 Canal street, to Manhan street, where they will occupy a new brick and cement two-story and basement building, 80' x 40', giving them twice the space and output that they have at present. The company now employs eighteen men, and will double this force. They do general machine work, making a specialty of power presses. The capital of the concern will be increased from $10,000 to $20,000. The officers are: President, A. W. Limont; treasurer, Adam Callan; secretary, C. F. Atwood. Mr. Callan is now general manager of the plant, Mr. Limont being connected with the manufacturing department of the Bridgeport Brass Company, Bridgeport, Conn.

The annual session of the summer school of the Design and Handicraft Guild of Minneapolis, Minn., will take place from June 13 to July 16. The aim of this school is to establish an intimate relation between the theory and practice of design. The technique of the shop is considered as a means to an end, not as an end sufficient in itself. The building in which the school is conducted was designed for the Handicraft Guild. It has fully equipped, well lighted shops and studios specially planned and fitted for the work in metal, jewelry, pottery, leather, etc. The officers of the school are M. Emma Roberts, president; Florence D. Willets, vice-president; Florence Wales, secretary and treasurer, to whom all inquiries for information should be addressed.

Regarding recent reports about the Blue Ridge Metal Manufacturing Company, of Susquehanna, Pa., the corporation reports that the company is owned by a number of local business men and two National banks, who combined and became the purchasers of the plant of the Susquehanna Metal Manufacturing Company recently sold at the trustee's sale. The plant is fully equipped for the manufacture of all products of sheet metal in brass and copper, with machinery for making special tools, dies, electroplating, and polishing. A specialty is manufacturing nickel, silver and brass candlesticks and shades for the Will & Baumer Company, of Syracuse. The plant is operated by electric power generated by water power controlled by the owners. On account of the favorable terms on which the plant was purchased, the low cost of rent and labor, and the favorable power arrangements, the owners believe that they can successfully underbid on products in their line.

Recent reports state that The Standard Brass and Copper Tube Co., which is located in the New London Industrial building at Woodbridge and Division streets, New London, Conn., will soon have running in its factory a night and day gang. Every day the business of the company is increasing and new men are being employed. Recently two machines have been installed. At the present the company has great future prospects for enlarging its plant. Work is going along successfully in all departments. F. J. Loomis, founder and president of this company, is an eminently practical man. He has been prominently connected with the brass and copper business for years. Before he founded the new company he was connected as hydraulic engineer with the American Brass Company at the Benedict & Burnham plant, the Chase Rolling Mill Company, of Waterbury, Conn., and later with the National Tube and Conduit Company, Hastings-on-the-Hudson. The product of the Standard Brass and Copper Tube Company is brass and copper tubes of all sizes and descriptions.

REMOVALS

The Art Engraving Company, pattern makers and casters, formerly located at 400 Canal street, New York City, have moved to 600 Broadway, Long Island City, N. Y.

The Brass Founders Supply Company are now occupying their fine new foundry building at Hamburg Place, Newark, N. J. This company makes a specialty of brass molders flasks, furnaces and other foundry equipment.

The Chicago Bearing Metal Company have moved their general offices from the Old Colony Building, Chicago, to suite 520-521 of the new McCormack Building, corner of Michigan Boulevard and Van Buren street, Chicago.

The Empire Brass Company have moved their foundry and machine shop from 701 Fulton street, Chicago, to the corner of Fulton and Green street, several blocks west. These people also control the Peerless Parting Company, manufacturers of special brands of parting.

The New York Nickel Plating and Manufacturing Company have moved their works and office from 125 Watts street to 327 East 63d street, New York City. With increased facilities for taking care of their customers' wants they invite a continuance of their old patrons.

The Pacific Metal Works, of Portland, Oregon, manufacturers of solder, type metal and babbitt, are now occupying their new building, which was specially designed and constructed for them. This structure occupies a full quarter block and is two stories high. This is one of the largest timbered buildings in Portland, and the floors are capable of carrying a weight of 1,000 lbs. to the square foot. In addition to their manufactured products this concern carries a large stock of sheet metal, copper and other metals of different kinds.

The Hanson & Van Winkle Company, Newark, N. J., manufacturers of electroplating materials, are just moving into their new office building, 269-271 Oliver street, which was described in the November, 1909, number of THE METAL INDUSTRY. They have also opened an office at 79 Walker street, near Broadway, New York City, in charge of A. R. Todd, where they carry a stock of various items in their line. This was done in order for them to be able to take care of the local trade by furnishing prompt delivery. The Chicago office of this company has also been moved to 108-110 North Clinton street, where they have 25,000 square feet of space. A. W. Storms is the manager.

INCORPORATIONS

Business organizations incorporated recently. In addressing them it is advisable to include also the names of the incorporators and their residence. Particulars of additional incorporations may frequently be found in the "Correspondence" columns.

SLACK-HAMER BRASS MANUFACTURING COMPANY, Denver, Col. Capital stock, $20,000. Brass manufacturers. Incorporators, Ben F. Slack, John W. Hamer, Frank Joseph Rees, all of Denver.

THE SUMMERILL TUBING COMPANY, Philadelphia, Pa. Incorporators, Francis M. Summerill, Edna V. Gabel and S. Landis Gabel. John R. Cassell, Drexel Building, Philadelphia, solicitor.

FLETCHER WHITE METAL COMPANY, Edgewater, New Jersey. Capital stock, $100,000. To manufacture a patent white metal. Incorporators, E. J. Forban, J. J. Harper and C. T. Martin, of 154 Nassau street, New York City.

THE SLADE MANUFACTURING COMPANY has recently been incorporated at Providence, R. I., with a capital of $100,000. The company will manufacture brass and copper seamless tubes and metal goods. The incorporators are: Frank Slade, E. A. Eddy and James H. Higgins, formerly governor of the State. The officers are: Frank Slade, president and general manager; H. Carpenter, vice-president; E. A. Eddy, treasurer; Benjamin Molton, secretary. The president, Mr. Slade, has been in business for a number of years as organizer and manager of tube plants. It is expected to have the new works ready early in June, and tubes of one inch diameter and smaller sizes will be manufactured.

PRINTED MATTER

BURNISHING PROCESS BY THE USE OF STEEL BALLS.—The Abbott Ball Company, of 1418 Hicks street, Hartford, Conn., have issued a pamphlet giving a description as to the method of using steel balls for burnishing small metal goods. The Abbott Ball Co. manufacture and also keep in stock, for immediate shipment, these steel balls of ⅛, ¼, 5/32 and 3/16" in diameter. Copies of the pamphlet may be secured upon application.

LACQUERS.—The Celluloid Zapon Company, manufacturers of lacquers, colored enamels and finishes for all purposes, 310 Fourth Avenue, New York, have started to send out a series of educational post cards in the interests of lacquers and finishes manufactured by them. The first of this series was a three-fold pos-

tal card giving three half-tone reproductions regarding the preparation of lacquers by the use of soluble cotton. The folder contains a return postal card, by means of which anyone interested may obtain a free sample of finish for anything that he desires.

POLISHING COMPOUNDS.—The Dow Chemical Manufacturing Company, Mansfield, Ohio, claim for their "I-X" lime composition, in a small folder recently issued, that it adheres better to the wheels, cleans more easily from work, contains a larger percentage of fatty greases, and colors more work to a higher luster than any other polishing compound made for the same purposes. This composition is made in three grades—dry, medium and greasy, and is packed in barrels containing 108 lbs., and in cases of 54 lbs. Prices will be furnished upon application.

TUMBLING BARRELS.—The Baird Machine Company, Oakville, Conn., have issued a twenty-four page pamphlet in the interests of their oblique tumbling barrels, which are used for the polishing of all kinds of articles made of brass and iron. These tumbling barrels are made in all sizes and descriptions and mounted with either cast iron or wood barrels. This company also manufacture barrels for japanning, which are mounted on the Baird oblique tilting tumblers and are operated in the same manner as the tumbling barrels. A copy of this pamphlet will be sent on application to the above firm by designating Bulletin No. 300.

FURNACES.—The W. S. Rockwell Company of 50 Church Street, New York, have issued a folder describing their reverberatory melting and refining furnaces. These furnaces are suitable for melting and refining brass, reducing copper and brass wire and miscellaneous scrap to ingot form, melting large quantities of lead, tin and zinc, and also for preparing metal for brass and bronze castings which are too large for the ordinary crucible furnace. These furnaces, which were described in the April issue of the THE METAL INDUSTRY, are designed for either oil or gas fuel, but the construction can be adapted for coal or coke. The folder gives a table showing the list of standard sizes that these furnaces are built in. Additional information may be obtained by writing for catalogue No. 10.

MACHINERY.—A catalogue of automatic cock grinders, molding machines, key lathes and foundry equipment has just been issued by the Turner Machine Company, of 3632 N. Lawrence street, Philadelphia, Pa. The catalogue is attractive in every respect, having a neat tasty cover and is printed on wood-cut paper. The quality of the printing is A1. Likewise the reading matter and cuts are well grouped, the illustrations of the various machines being frontispieces to the reading matter which follows on the next page. Besides the machinery mentioned, which is shown in the catalogue, there is also illustrated the Turner patent automatic sand sifter and mixer, power and foot sprue cutters and flasks. Some of the Turner specialties are cock grinders, which have been sold in all parts of the world, likewise key lathes. A copy of the catalogue is sent willingly upon application.

AD NEWS

The Jonathan Bartley Crucible Company, of Trenton, N. J., have opened an office in the Bourse building, Philadelphia, Pa., which is in charge of L. T. Ward.

The Newport Sand Bank Company, Newport, Ky., announce that their famous Newport sand is unequalled for stove plate, brass, aluminum, hardware and all malleable castings.

The Rockwell Furnace Company, 26 Cortlandt Street, New York, as usual have an interesting advertisement describing their furnaces. Their catalog "M-1" gives full particulars.

The Oriental Rouge Company, Bridgeport, Conn., are again advertising their rouge which is particularly well adapted for gold, sterling silver, silver plate and all soft metals.

The Detroit Foundry Supply Company, Detroit, Mich., have a striking and interesting page showing portraits of their representatives who will welcome visitors to the Detroit convention.

The Monarch Engineering and Manufacturing Company, Baltimore, Md., invite readers to send for their catalog "T. M. I.—6" describing "Steel-Harvey" furnaces and the "Monarch Acme Core Oven."

W. S. Rockwell Company, 50 Church Street, New York City, illustrate their double end under fire annealing furnace which is described in a new catalog "12-E" which they will send on application.

J. B. Wise, Watertown, N. Y., who has been advertising the "M. R. V." furnace, which has attracted a great deal of attention in the past year, will send circulars "M. R. V." fully describing this furnace to those who are interested.

White & Brother, Inc., with main office at 1515 Montgomery Avenue, Philadelphia, Pa., and a large copper refinery at Bridesburg, Pa., invite correspondence from parties having brass and copper skimmings, grindings, buffings, sweepings, etc., to sell.

The Finished Parts Manufacturing Company, 68 Orchard Street, Newark, N. J., manufacturers of die castings, such as chain gears, bevel gears, spur gears, bearings, numbering wheels, etc., have taken space in THE METAL INDUSTRY, in which to advertise their products.

J. D. Smith Foundry Supply Company, foundry engineers, Cleveland, Ohio, are featuring their "Cleveland Squeezer" and "Cleveland Water Tumbler" in this month's advertisement. Their catalog A-42 gives particulars regarding their complete line of foundry equipment.

The O. J. Moussette Company, Inc., Brooklyn, N. Y., are again to the front with a full page advertisement of the Monarch Crusher and Pulverizer, which they now make in several sizes suitable for use by manufacturing jewelers and small foundries as well as in the larger establishments.

The North American Smelting Company, Philadelphia, Pa., have increased their space and call attention to their complete line of ingot metals, babbitt and type metals, tinners' and brazing solders, lead and block tin pipes. This company also furnishes castings in any of the metals which they manufacture.

The Blue Ridge Metal Manufacturing Company, Susquehanna, Pa., have unusual facilities for producing sheet metal goods of every description, special tools and dies, and doing polishing and plating at low cost. They invite those in the market for any of the above-mentioned items to send samples from which quotations can be made.

Leiman Brothers, 62 John Street, New York, have a page advertisement illustrating and describing their noiseless blowers which are made in seven sizes at from $17.00 to $130.00 and their sand blasts, which are made in four sizes at from $17.00 to $50.00 in price. This firm has a large factory at Newark, N. J., where they manufacture this equipment.

The Indian Refining Company, Inc., with main office at Cincinnati, O., and refineries at Fayette, Ky., Lawrenceville, Ill., and East St. Louis, Ill., are calling attention to their fuel oil for melting metals. This oil they state is entirely free from sulphur and unusually high in heat units. They are prepared to make shipments by the barrel or in carload lots.

One of the new type of sand sifters manufactured by the W. Bilz Sand Mixer and Sifter Company, 1314 Findlay avenue, New York, which has been advertised for some time in THE METAL INDUSTRY, will be on exhibition at the Detroit convention. The machine will be operated by Whitehead Brothers Company, of New York, in connection with their exhibit of molding sands.

The Bayless Chemical Laboratory, Muncie, Ind., have a card in this issue announcing that their laboratory is completely equipped to handle all kinds of commercial metallurgical analysis. The laboratory specializes on all the non-ferrous metal and alloys. A number of the chemists connected with it have had years of experience in the production as well as in the analysis of the above-mentioned materials and also of steel and iron.

COPPER PRODUCTION

(Issued by the Copper Producers' Association.)

	May 9, 1910. Pounds.
Stocks of marketable copper of all kinds on hand at all points in the United States, April 1, 1910....	123,824,874
Production of marketable copper in the United States from all domestic and foreign sources during April, 1910.....	117,477,639
	241,302,513
Deliveries:	
For domestic consumption..... 67,985,951	
For export..... 31,332,403	
	99,318,354
Stock of marketable copper of all kinds on hand at all points in the United States, May 1, 1910..	141,984,159
Stocks increased during the month of April.....	18,159,285

According to the above figures the stock of marketable copper increased during the month of April 18,159,285 pounds. The production in April was nearly three million pounds less than in March, and domestic consumption was about five million tons more, while the exports were over nine million tons less in April than the month previous.

METAL MARKET REVIEW.

New York, May 9, 1910.

Copper.—The price of standard copper in London shows a further decline during the month of about £3 per ton, making a net decline since January 1 of £9 per ton. The English stocks of copper show a decrease for the month of 6,750,000 pounds.

In the New York market there has been some good buying by consumers. The Calumet & Hecla Company gauged the market correctly, and by reducing their price to 13 cents were able to book all the business they cared to take at this price, while the large selling agents were "holding the umbrella" and probably playing Wall Street instead of watching the copper market. Today these same selling agents (?) are ready to sell at 13 cents, but the procession seems to have gone by. Possibly when the market gets down to 12½ or 12 cents they may be sellers again unless the C. & H. has not again scooped the market. The Standard Oil crowd never has made any kind of a success of the copper market.

Copper today looks like going to 12 cents per pound, and at this price there is a good margin of profit for all producers. According to the annual report of the Utah Copper Company for the year 1909 the average cost of their copper was 8.787, and the average price received was 12,915; any larger percentage than this might very truly be classed as robbery. 4⅛ cents per pound on a cost of 8.787 cents looks like a fortune to the poor consumer of the metal, but then the "ultimate consumer" seems to be an unknown and very much neglected quantity.

The copper market today is weak and unsettled in sympathy with the same conditions in the iron and steel market, and unless trade gets more active the price of copper should go to 12 cents per pound. In the pig iron market already production is being curtailed and the market will adjust itself, but unless there is some systematic curtailment in the production of copper, prices must go lower. Lake is quoted today 12⅞ to 13 cents, against 13½ cents a month ago. Electrolytic, 12⅜ to 12½ today, against 13¼ same period. Casting, 12⅜ to 12½, against 13.15 early last month.

The exports for the month, 13,062 tons, were the smallest since May, 1907; the foreign market is pretty well stocked with copper and the price there today is below the New York market.

Tin.—The price of tin in London shows a net decline for the month of about £2 per ton; the trading has been fairly active, but the fluctuations have not been as violent as usual.

In the New York market the demand from consumers has been good, deliveries are estimated at 4,100 tons for the month. The local deliveries for the four months of 1910 show an increase of 2,200 tons over the same period last year. The shipments from the Straits were 4,027 tons, and the visible supply of tin on April 30 was 17,932 tons. This is 2,400 tons less than a month ago. Those figures would usually be considered bullish were it not for the belief that tin is being held back at the Straits.

The market is fairly strong at around 33 cents for spot, with futures 10 to 15 points higher.

Lead.—The London market is a shade easier at £12 10s., against £12 18s. 9d. a month ago.

The New York market has held fairly steady and prices today are only about 7½ points lower than a month ago. New York carload lots 4.42½, with May and June offered at 4⅜ cents. In St. Louis the market is dull at 4.25.

Spelter.—The foreign market is £1 lower at £22.

In New York spelter has declined nearly ½ cent per pound; actual spot spelter is scarce in New York, and is quoted at 5⅜ cents, but shipment from the West can be obtained at close to 5.15 New York. In St. Louis the market is dull and easy at 5 cents.

Aluminum.—The market holds very steady at 23 to 23¼ cents, 98-99 per cent. pure ingots, in 1 to 5-ton lots. Smaller lots 24 to 25 cents.

Antimony.—The foreign market holds steady at £30 for Halletts, £29 for ordinary brands.

The New York market is about ⅛ cent per pound lower than a month ago, with the New York market below the importation price. Cooksons, 8⅜; Halletts, 8⅛; Hungarian, grade, 7⅜. Chinese is freely offered in round lots at 7¼ to 7⅜ cents, 99¼ to 99½ pure.

Silver.—The London price of silver has advanced during the month 13-16d., and closes at 24 15-16d. In the New York market prices have advanced nearly 2 cents per ounce and close at 54¼ cents.

Quicksilver.—The London market holds steady at £9 5s. In New York prices are inclined to be easier, at $48 per flask wholesale, and at $49 to $49.50 for jobbing lots.

Platinum.—The market holds steady at $36 per ounce for hard, and $30.50 for ordinary.

Street Metals.—Street copper has been reduced to 18 cents base, copper wire 14¼ cents, seamless brass tubing 18 cents, copper tubing 22 cents base, and street brass at 14 cents.

Old Metals.—With a sagging copper market the old metal dealers are all more or less miserable, consumers are inclined to hold off and the outlook is not encouraging. Prices are all lower.—J. J. A.

THE APRIL MOVEMENTS IN METALS

Copper.	Highest.	Lowest.	Average.
Lake	13.50	13.00	13.25
Electrolytic	13.25	12.50	12.85
Casting	13.15	12.50	12.75
Tin	33.40	32.50	33.00
Lead	4.50	4.40	4.45
Spelter	5.65	5.25	5.45
Antimony (Hallett's)	8.50	8.25	8.40
Silver	.54¼	.52⅛	53.22

WATERBURY AVERAGE

The average price of lake copper per pound as determined monthly at Waterbury, Conn.

1909.—Average for year, 13,416. 1910.—Jan. 13⅞. Feb. 13⅞. March 13¾. April 13¼.

INFORMATION BUREAU

Any firm intending to buy metals, machinery or supplies and desiring the names of the various manufacturers and sellers of these products can obtain the desired information by writing to The Metal Industry. Commercial questions are answered by return mail. Our Information Bureau is for the purpose of answering questions of all kinds. Address The Metal Industry, 99 John street, New York.

Metal Prices, May 9, 1910

NEW METALS.

	Price per lb. Cents.
COPPER—PIG, BAR AND INGOT AND OLD COPPER. Duty Free, Manufactured 2½c. per lb.	
Lake, carload lots	13.00
Electrolytic, carload lots	12.50
Casting, carload lots	12.50
TIN—Duty Free.	
Straits of Malacca, carload lots	33.00
LEAD—Duty Pigs, Bars and Old, 2½c. per lb.; pipe and sheets, 2⅜c. per lb.	
Pig lead, carload lots	4.40
SPELTER—Duty 1⅜c. per lb. Sheets, 1⅝c. per lb.	
Western carload lots	5.25
ALUMINUM—Duty Crude, 7c. per lb. Plates, sheets, bars and rods, 11c. per lb.	
Small lots	28.00
100 lbs. lots	25.00
Ton lots	23.00
ANTIMONY—Duty 1½c. per lb.	
Cookson's, cask lots, nominal	8.35
Hallett's, cask lots	8.15
Other cask lots	7.25
NICKEL—Duty Ingot, 6c. per lb. Sheet, strips and wire 35% ad valorem.	
Shot, Plaquettes, Ingots, Blocks, according to quantity	.45 to .60
MANGANESE METAL—Duty 20%	.80
MAGNESIUM METAL—Duty 3 cents per pound and 25% ad valorem	$1.60
BISMUTH—Duty free	1.80
CADMIUM—Duty free	.75
	Price per oz.
GOLD—Duty free	$20.67
SILVER—Duty free	.54
PLATINUM—Duty free	29.75
QUICKSILVER—Duty 7c. per lb. Price per pound	67c. to 70c.

OLD METALS.

Dealers' Buying Prices. Cents per lb.		Dealers' Selling prices. Cents per lb.
11.00 to 11.75	Heavy Cut Copper	12.50 to 12.75
11.00 to 11.50	Copper Wire	12.25 to 12.50
10.25 to 10.50	Light Copper	11.00 to 11.25
10.50 to 10.75	Heavy Mach. Comp.	11.75 to 12.00
8.00 to 8.25	Heavy Brass	9.00 to 9.25
6.25 to 6.50	Light Brass	7.25 to 7.50
7.25 to 7.50	No. 1 Yellow Brass Turnings	8.25 to 8.50
9.00 to 9.25	No. 1 Comp. Turnings	9.75 to 10.25
3.75 to 4.00	Heavy Lead	—— to 4.25
3.70 to 3.80	Zinc Scrap	—— to 4.50
5.00 to 5.50	Scrap Aluminum, turnings	5.00 to 5.50
10.00 to 12.00	Scrap Aluminum, cast, alloyed	11.00 to 13.00
14.00 to 15.00	Scrap Aluminum, sheet (new)	16.00 to 18.00
19.50 to 20.00	No. 1 Pewter	23.00 to 24.00
25.00 to 27.00	Old Nickel	28.00 to 30.00

INGOT METALS.

	Price per lb. Cents.
Silicon Copper, 10% to 20% ... according to quantity	28 to 35
Silicon Copper, 30% guaranteed. " "	38
Phosphor Copper, 5% ... " "	19 to 21
Phosphor Copper 10% to 15%, guaranteed ... " "	28 to 30
Manganese Copper, 30% ... " "	30 to 35
Phosphor Tin ... " "	34 to 36
Brass Ingot, Yellow ... " "	9 to 10
Brass Ingot, Red ... " "	12 to 13
Bronze Ingot ... " "	11 to 12
Manganese Bronze ... " "	17 to 19
Phosphor Bronze ... " "	13 to 16
Casting Aluminum Alloys ... " "	29 to 35
PHOSPHORUS—Duty 18c. per lb. According to quantity	30 to 35

PRICES OF SHEET COPPER.

BASE PRICE, 18 Cents per Lb. Net.

PRICES MENTIONED BELOW ARE FOR QUANTITIES OF 100 LBS. AND OVER.

SIZE OF SHEETS.		64 oz. and over 50 lb. sheet 30 x 60 and heavier.	32 oz. to 64 oz. 25 to 50 lbs. sheet 30 x 60.	24 oz. to 32 oz. 18¾ to 25 lb. sheet 30 x 60.	16 oz. to 24 oz. 12½ to 18¾ lb. sheet 30 x 60.	14 oz. and 15 oz. 11 to 12½ lb. sheet 30 x 60.	12 oz. and 13 oz. 9½ to 11 lb. sheet 30 x 60.	10 oz. and 11 oz. 7¾ to 9½ lb. sheet 30 x 60.	8 oz. and 9 oz. 6¼ to 7¾ lb. sheet 30 x 60.	Lighter than 8 oz.
		Cents Per Pound Over Base Price for Soft Copper.								
Not wider than 30 ins.	Not longer than 72 inches.	Base	Base	Base	Base	1	2	3	6	9
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	1	3	6	9	
	Longer than 96 inches.	"	"	"	"	2	6			
Wider than 30 ins. but not wider than 36 inches.	Not longer than 72 inches.	"	"	"	"	2	4	7	10	
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	2	6	9		
	Longer than 96 inches. Not longer than 120 inches.	"	"	"	1	3				
	Longer than 120 inches.	"	"	1	2					
Wider than 36 ins. but not wider than 48 inches.	Not longer than 72 inches.	"	"	1	2	4	7	10		
	Longer than 72 inches. Not longer than 96 inches.	"	"	1	3	5	8			
	Longer than 96 inches. Not longer than 120 inches.	"	"	2	4	8				
	Longer than 120 inches.	"	1	3	6					
Wider than 48 ins. but not wider than 60 inches.	Not longer than 72 inches.	"	Base	1	3	6	11			
	Longer than 72 inches. Not longer than 96 inches.	"	"	2	4	9				
	Longer than 96 inches. Not longer than 120 inches.	"	1	3	6					
	Longer than 120 inches.	1	2	4	8					
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 inches.	Base	1	3	8					
	Longer than 96 inches. Not longer than 120 inches.	"	2	5	10					
	Longer than 120 inches.	1	3	8						
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 inches.	1	3	6						
	Longer than 96 inches. Not longer than 120 inches.	2	4	7						
	Longer than 120 inches.	3	5	9						
Wider than 108 ins.	Not longer than 132 inches.	4	6							
	Longer than 132 inches.	5	8							

The longest dimension in any sheet shall be considered as its length.

CIRCLES, SEGMENTS AND PATTERN SHEETS, advance over prices of Sheet Copper required to cut them from. 3 cents per pound.

COLD OR HARD ROLLED COPPER, 14 oz. per square foot, and heavier, add ... 1 " " "

COLD OR HARD ROLLED COPPER, lighter than 14 oz., per square foot, add ... 2 " " "

POLISHED COPPER, 20 INCHES WIDE and under, advance over price for Cold Rolled Copper of corresponding dimensions and thickness ... 1 " " sq. ft.

POLISHED COPPER, WIDER THAN 20 INCHES, advance over price for Cold Rolled Copper of corresponding dimensions and thickness ... 2 " " " "

COLD ROLLED COPPER, PREPARED SUITABLE FOR POLISHING, same as Polished Copper of corresponding dimensions and thickness.

COLD ROLLED AND ANNEALED COPPER SHEETS OR CIRCLES, same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

ROUND COPPER ROD, ⅝ inch diameter or over ... Base Price.

(Rectangular, Square and Irregular Shapes, Copper Rod, Special Prices.)

	Cents per lb.
ZINC—Duty, sheet, 1¾c. per lb.	
Carload lots, standard sizes and gauges, at mill	7.50 less 8%
Casks	8.00
Open casks	8.50

Metal Prices, May 9, 1910

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect May 2, 1910, and until further notice.

To customers who purchase less than 40,000 lbs. per year and over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.13½	$0.15	$0.17
Wire	.13½	.15¾	.17½
Rod	.13½	.15¾	.18¼
Brazed tubing	.18¾	—	.20¾
Open seam tubing	.16¾	—	.18¾
Angles and channels, plain	.16¾	—	.18¾

50% discount from all extras as shown in American Brass Manufacturers' Price List No. 7.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring drawing and spinning brass	½c.	per lb. net advance
" —Best spring, drawing and spinning brass	1½c.	" " " "
Wire —Extra spring and brazing wire	½c.	" " " "
" —Best spring and brazing wire	1c.	" " " "

To customers who purchase less than 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.14½	$0.16	$0.18
Wire	.14½	.16¾	.18¼
Rod	.14½	.16¾	.19¼
Brazed tubing	.19¾	—	.21¾
Open seam tubing	.17¾	—	.19¾
Angles and channels, plain	.17¾	—	.19¾

5% discount from all extras as shown in American Brass Manufacturers' Price List No. 7.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass	½c.	per lb. net advance
" —Best spring, drawing and spinning brass	1½c.	" " " "
Wire —Extra spring and brazing wire	½c.	" " " "
" —Best spring and brazing wire	1c.	" " " "

BARE COPPER WIRE—CARLOAD LOTS.

14.25 per lb. base.

SOLDERING COPPERS.

300 lbs. and over in one order	18½c. per lb. base.
100 lbs. to 300 lbs. in one order	19c. " " "
Less than 100 lbs. in one order	20½c. " " "

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in O. D. Nos. 4 to 13 Stubs' Gauge, 18c. per lb.
Seamless Copper Tubing, 22c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe Size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.	26	25	20	19	18	18	18	18	18	18	18	19	20	22	24	25

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 feet Brass.	Bronze.
¾ inch	$8	$9
½ inch	8	9
⅝ inch	10	11
¾ inch	12	13
⅞ inch	14	15
1 inch	18	20
1¼ inch	22	24
1¼ inch	25	27
1½ inch	32	35
1¾ inch	45	48
2 inch	56	60

Discount 45 and 5%.

PRICES FOR MUNTZ'S METAL AND TOBIN BRONZE.

Muntz's or Yellow Metal Sheathing (14" x 48")	15c. net base
" " " Rectangular sheets other than Sheathing	16½c. " "
" " " Rod	14½c. " "
Tobin Bronze Rod	16c. " "

Above are for 100 lbs. or more in one order.

PLATERS' METALS.

Platers' bars in the rough, 22½c. net.

German silver platers' bars dependent on the percentage of nickel, quantity and general character of the order.

Platers' metal, so called, is very thin metal not made by the larger mills and for which prices are quoted on application to the manufacturers.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Not over 18 in. in width, not thinner than 23 B. S. Gauge, 2c. above price of pig tin in same quantity.

Not over 35 in. in width, not thinner than 22 B. S. Gauge, 3c. above price of pig tin.

PRICE SHEET FOR SHEET ALUMINUM—B. & S. Gauge.

Wider than..... and including....	31in. 12in.	6in. 14in.	14in. 16in.	16in. 18in.	18in. 20in.	20in. 24in.	24in. 30in.	30in. 36in.	36in. 40in.
	in coils.								
No. 13 and heavier	34	34	36	36	36	36	39	39	39
" 14	34	34	36	36	36	36	39	39	39
" 15	34	34	36	36	36	36	39	39	39
" 16	34	34	36	36	36	36	39	39	39
" 17	34	34	36	36	36	36	39	39	39
" 18	34	34	36	36	36	36	39	39	42
" 19	34	34	36	36	36	36	39	40	43
" 20	34	36	36	36	36	38	41	42	44
" 21	34	38	38	38	38	40	43	44	50
" 22	34	38	38	38	40	40	43	47	51
" 23	34	38	38	38	40	40	43	49	52
" 24	34	38	40	42	42	42	45	51	54
" 25	36	39	41	43	43	43	46	53	57
" 26	36	39	42	46	46	46	51	55	61
" 27	36	40	44	48	48	49	54	58	64
" 28	36	40	46	48	49	49	56	62	67
" 29	38	41	48	50	52	52	61	67	72
" 30	38	42	50	52	56	62	69	72	77
" 31	43	47	55	58	63	71	74	77	83
" 32	45	49	57	61	69	77	91	90	95
" 33	47	51	60	65	73	84	91	100	110
" 34	50	55	62	70	78	91	103	110	120
" 35	..	65	70	80	90	100	115	125	..
" 36	..	80	90	100	115	120	135	..	..
" 37	..	104	114	129	144	159	174	..	..
" 38	..	124	139	154	169	184	204	..	..
" 39	..	144	164	184	204	224	..	..	..
" 40	..	174	204	224	244	..	..	..	..

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are 100 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICE LIST SEAMLESS ALUMINUM TUBING.

STUBS' GAUGE THE STANDARD. SIZES CARRIED IN STOCK.
Outside Diameters. BASE PRICE, 25 Cents per Pound.

Stubs' Gauge.	Inches.	¼ in.	5-16 in.	⅜ in.	½ in.	⅝ in.	¾ in.	⅞ in.	1 in.	1¼ in.	1½ in.	1¾ in.	2 ins.	2½ ins.	3 ins.	3½ ins.	4 ins.	4½ ins.
11.	.120.	..	..	..	..	..	..	..	27	24	..	..	14	12	10	9	16	23
12.	.109.	..	..	..	..	..	..	..	26	..	..	..	15	..	..	..	..	..
14.	.083.	..	..	..	..	..	..	..	..	..	..	..	17	..	..	..	..	..
16.	.065.	..	..	.	..	..	28	27	27	24	23	21	21	21	21	27	31	37
18.	.049.	..	..	..	..	33	30	29	28	25	26	26	26	..	..	..	..	..
20.	.035.	117	..	46	39	34	33	32	30	29	30	30	30	31	38	49	58	81
21.	.032.	..	..	..	40	..	..	..	..	..	..	..	..	..	..	..	..	..
22.	.028.	138	98	48	42	38	37	35	34	..	..	45	..	..	..	..	..	..
24.	.022.	188	133	108	88	79	73	62	60	66	..	..	..	..	..	..	..	..

Prices are for ten or more pounds at one time. For prices on sizes not carried in stock send for Manufacturers' List.

PRICE LIST FOR ALUMINUM ROD AND WIRE.

Diameter. B. & S. G'ge.	000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price, per lb....	32	32½	32½	33	33½	34	34½	35	36	37	38	43	46

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	$0.58
13	.53	17	.59
14	.54	18	.60
15	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive. American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 50%.

GERMAN SILVER TUBING.

4	per cent.	to No.	19, B. & S. Gauge, inclusive		$0.60
6	"	"	19, " " "		.70
9	"	"	19, " " "		.85
12	"	"	19, " " "		1.00
15	"	"	19, " " "		1.15
16	"	"	19, " " "		1.20
18	"	"	19, " " "		1.30

German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.

For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 40%.

PRICE OF SHEET SILVER.

Rolled sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given, as prices range from 2c. below to 6c. above the price of bullion.

Rolled silver anodes .999 fine are quoted at 2c. to 3½c. above the price of bullion.

THE UNITED STATES ALUMINUM COMPANY

PITTSBURGH, PA.

ALUMINUM

SHEET TUBING
EXTRUDED SHAPES
ROD RIVETS WIRE
ELECTRICAL CONDUCTORS

Branch Offices

NEW YORK—99 John St.
BOSTON—131 State St.
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PITTSBURGH—1504 Park Bldg.
PHILADELPHIA—320 Witherspoon Bldg.
ROCHESTER—406 Powers Block
CLEVELAND—719 Garfield Bldg.
WASHINGTON—514 Nat. Met. Bk. Bldg.
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METAL ROLLING MILLS.

INGOT, PLATE, SHEET, ROD, WIRE, TUBE, METAL GOODS.

HENDRICKS BROTHERS
Manufacturers of
Sheet and Bar Copper
COPPER FIREBOX PLATES
and STAYBOLTS
WIRE and BRAZIER'S RIVETS
IMPORTERS AND DEALERS IN
INGOT COPPER, BLOCK TIN,
SPELTER, LEAD, ANTIMONY
BISMUTH, NICKEL, Etc.
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THE LARGEST AND MOST FULLY EQUIPPED BRASS ROLLING MILLS AND METAL GOODS MANUFACTURING ESTABLISHMENT IN THE WORLD
Estimates for Specialties in Brass, German Silver and Aluminum furnished on application. DEPOTS:
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General Offices, Mills and Factories.
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Shipments Upon Receipt of Order From Large Stock of
SEAMLESS DRAWN BRASS AND COPPER TUBING
BRASS {SHEET ROD WIRE} COPPER {SHEET ROD WIRE}
AT WATERBURY GERMAN SILVER {SHEET ROD WIRE}

Non-Corrosive Finest Quality
COPPER AND YELLOW
(Muntz) Metal
Naval Brass
Naval Bronze
Manganese Bronze
Plates, Sheets, Bolts, Bars, Rods, Nails, Tacks, &c.
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NEW BEDFORD, MASS.
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C. G. HUSSEY & CO.
PITTSBURGH, PENNA.
Manufacturers of
COPPER
In Sheets, Plates, Rolls
ANODES
Tacks and Nails

Bridgeport Brass Co.
BRIDGEPORT, CONN.
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Manufacturers of
Brass and Copper { Sheet, Tubing, Wire and Rods.
Metal Goods Made to Order from Sheet, Rod, Wire and Tubing

BRASS and COPPER in Sheets and Rolls
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BRITANNIA METAL
B. & M. BABBITT METAL for Bearings
LINING METAL for Automobile Bearings and Copper for Electrical Purposes
H. K. & F. S. BENSON
GLEN RIDGE, N. J.

THE SEYMOUR MFG. CO.
SEYMOUR, CONN.
German Silver
BRASS, COPPER and BRONZE IN SHEETS, WIRE, RODS and TUBES
COPPER AND NICKEL ANODES
Resistance Wires, Wire, Shot Copper

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FOR SALE
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MANUFACTURERS OF
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SOLE MANUFACTURERS TOBIN BRONZE
(Trade-Mark Registered)

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Manufacturers of
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Baltimore Copper Smelting and Rolling Company
BALTIMORE, MARYLAND
SHEET COPPER

"RIVERSIDE" German Silver
Phosphor Bronze
Sheets, Rods, Wire, Ingots, Castings,
Jewelers' Bars and Alloys
The Riverside Metal Co.
Riverside, Burlington Co., N. J.

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INGOT, PLATE, SHEET, ROD, WIRE, TUBE, METAL GOODS.

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NICKEL SILVER, BRASS, COPPER, BRONZE AND PURE COPPER
TUBING FOR ELECTRICAL PURPOSES
Odd and Special Shapes, and Small Tubing, a Specialty
—ALSO THE—
Bourdon Steam Gauge Springs
All sizes from 8 to 36, B. & S. Gauge.

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Rollers of Silver Anodes and Sterling Silver
ALSO DEALERS IN
FINE GOLD AND SILVER
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Long Distance Phone 3759 R.

LINTON & CO.
95 PINE STREET PROVIDENCE, R. I.
MANUFACTURERS OF
SEAMLESS BRASS . . **TUBING**
In Small Sizes
GOLD SOLDER, sheet or wire.
SILVER SOLDER, sheet or wire.
SHEET BRASS SOLDER

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WATERBURY, - - CONN.
Manufacturers of
Rolled Brass, Bronze, German Silver and Copper in Thin Gauges, Platers' Metal

Established 1859. Telephone connection.
JOHN TOOTHILL
BRITANNIA METAL. ANTIMONIAL LEAD.
SHEET BLOCK TIN
CASTING, ROLLING AND REFINING.
66 Pitt Street, New York City
ROCHELLE PARK, N. J.

SEAMLESS STEEL TUBING
From 4 in. Diameter to 1-64 in.
Finished Bright, Smooth and Accurate to 1-1000 In. Inside and Out
Tool Steel Tubing. Soft Steel Tubing. Also Small Brass, Copper and Aluminum Tubing.
ELLWOOD IVINS TUBE WORKS
Oak Lane Station, Philadelphia, Pa.

ROLLED FIRELESS STERLING SILVER
SILVER SOLDERS, ANODE SILVER and SILVER WIRE
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HARD LEAD IN SHEETS
SHEET BLOCK TIN
Ask About BRITANNIA METAL CASTING, ROLLING and REFINING FOR THE TRADE.
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PLATED SHEET METALS
FANCY ROLLED METALS
Nickelzinc, Brasszinc, Copperzinc, Bronzezinc, Nickeltin, Brasstin, Coppertin, Bronzetin Sheet Zinc, polished and unpolished, for stamping.
Large Saving to Manufacturers Last Year's Sales 1,000,000 lbs.
For Further Information Address Office: PERU, ILLINOIS

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LA SALLE, ILLINOIS
Smelters of Spelter
and Manufacturers of
Sheet Zinc and Sulphuric Acid
Zincs for Leclanche Battery
Special Sizes of Zinc to order. Rolled Battery Plates. Selected Plates for Etchers' and Lithographers' use. Selected Sheets for Paper and Card Makers' use. Stove and Washboard Blanks.

Horsehead Spelter
The Original Brand of Pure Spelter
Indispensable in the manufacture of
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High Grade Spelter
GOLDEN ROD BRAND
Suitable for High Grade Brass Work, Cartridge Metal, Etc.
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HIGH GRADE
SPELTER
SUITABLE FOR ALL PURPOSES
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IN COILS FOR
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Dealers in New and Old Metals, and the Largest Buyers of Zinc Dross, Skimmings, Sal Skimmings, Scrap Zinc and Aluminum

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Offer for Sale:
HEAVY COPPER AND WIRE
Ready for the Crucible
COMPOSITION
Carefully Selected
HEAVY YELLOW BRASS
Free from Iron
OLD METALS GENERALLY

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MEAKER SELF-SUSTAINING SOLUTION

Send, collect, samples of your product. We will galvanize and return them free of charge. If samples please you, we can offer you an attractive proposition.

Make us prove the claims we make, at OUR expense, to YOUR satisfaction

Our new booklet M tells all about this perfect galvanizing process and our automatic machinery. Ask for it.

No royalty on solution or machines

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NEW PROCESS DRY GALVANIZING

We will do it for you at from a cent and a quarter upwards, depending upon kind and quantity of your material.

We will supply complete equipment so you can do it, at $500.00 and upwards, depending upon kind and quantity of material required to be treated daily.

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The GLOBE MACHINE & STAMPING CO.

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Are YOU familiar with the

STEEL BALL BURNISHING PROCESS

which takes the place of buffing both before and after plating, on almost all kinds of small metal goods?

Send for pamphlet "A B C," which is full of valuable information on the use of steel balls.

STEEL BURNISHING BALLS

sizes 1/8, 5/32, 3/16 and 1/4" always in stock for immediate shipment.

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If You Make

Buffing Compositions, Metal Polishes, Polishing Rouges, Scouring Soaps, Cleaning Compounds, or anything of similar nature, you ought to investigate

Missouri Tripoli Flour

It may be better suited for your purposes than the material you now use. *It may save you money.*

MISSOURI TRIPOLI FLOUR is made in all grades and colors—"Rose," "Cream" and "White." It is the most effective VERY FINE abrasive known. Our finest grade—"Air Dust"—is an impalpable powder, and yet a very fine abrasive.

MISSOURI TRIPOLI STONE, in its natural state, or the flour, will absorb 50% of its own weight of fluids of the consistency of water. We also make TRIPOLI STONES FOR WATER FILTERS.

Prices upon application.

American Tripoli Company

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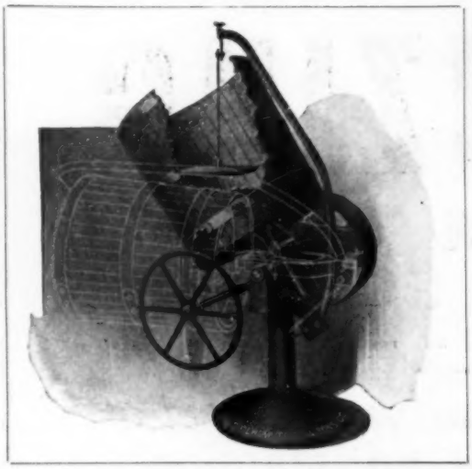

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For plating small articles in one operation

SIMPLE, ECONOMICAL and EFFICIENT

The work is always visible. Will pay for themselves in a very short time. For Nickel, Brass, Copper, Bronze, Zinc, etc.

Write at once for full details, and join the hundreds of customers who are saving money by their use.

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Hard or Medium, are easily the best canvas wheels on the market.

We carry complete stock of Felt Wheels, Cotton Buffs, Oriental Turkish Emery, Chemicals, Buffing Composition, etc.

Everything for the Plating and Polishing Room.

Write for catalogue "C H"

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Complete Plating Plants Installed

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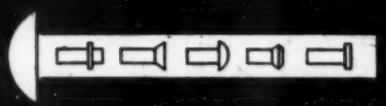

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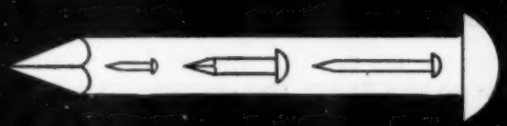

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GERMAN SILVER, ALUMINUM, ETC.
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PLATED IN ANY FINISH
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ENDLESS SEWED POLISHING BELTS
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FOR NON-FERROUS METALS ONLY
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For Grinding, Buffing and Polishing
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THE BEST ROUGE
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ORIENTAL ROUGE CO.
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Sole American Manufacturers
OF ELECTROLYTIC
CAUSTIC POTASH

Liquid { 45 per cent to / 49 per cent } In any Size Drums { Solid / Broken } 90 per cent

MURIATIC ACID, 18-22 degrees
FREE from SULPHUR and ARSENIC

NIAGARA ALKALI COMPANY
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SAL AMMONIAC for galvanizing and soldering
PRUSSIATE OF SODA AND POTASH,
BARIUM CHLORIDE, FERRO PRODUCTS,
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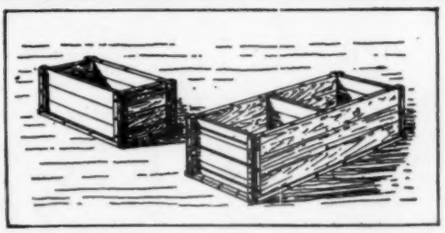

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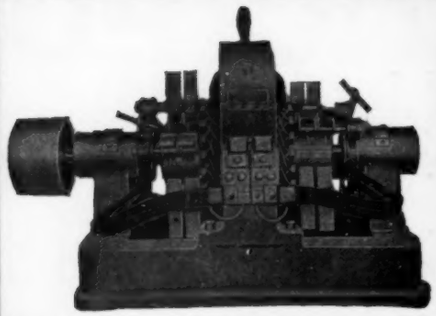

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WORKS: MATAWAN, N. J.

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Standard Size Oven Knocked Down for Shipment.

Used for JAPANNING, LACQUERING, ENAMELING, CORE BAKING, DRYING, TEMPERING, SHERARDIZING

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The Steiner Sectional Portable Ovens

Designed to meet special conditions. Heated by gas and adaptable for many lines of manufacture. Used for Japanning, Enameling, Baking and Drying. Has many superior advantages.

DRYING OUT BOXES

Fitted with steam coils or gas burners where steam is not available. Send for Catalogue.

E. E. STEINER, 60 UNION ST., NEWARK, N. J.

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The "IXL" Lathe
For Grinding and Polishing.

Detachable Spindle, Strong, Efficient, Inexpensive.

Belt runs to shaft overhead or through floor.

IN

EQUIPMENT AND SUPPLIES FOR

Electro-Platers Polishers, Buffers Galvanizers

VICTOR WHITE POLISH
For imparting a fine lustre to nickel-plated work.

Tripoli and Crocus Composition

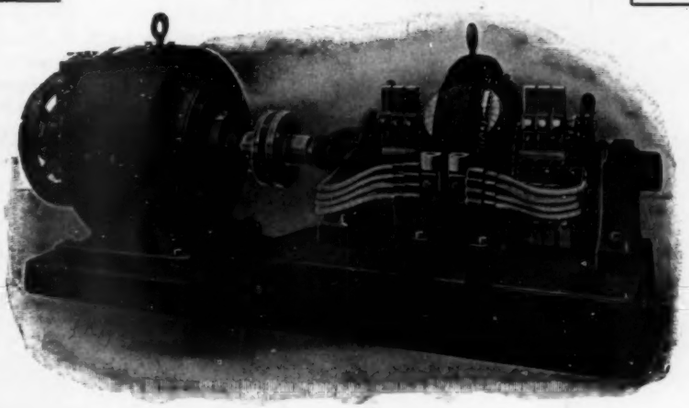
CARBONATE of COPPER and NICKEL SALTS

HAVE you heard of the remarkable records made by our new

Triplex Buff ?

How it gives double the wear?
How it saves one fifth the composition?
How it can be remade to original size when worn down?

See cut below



Direct-Connected Generator Set, Size G. G., Type S. H.
Low Voltage Generators, 25 to 12,500 Amperes Capacity.
Standard or Three Wire Systems.

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Plating and Finishing at one operation in Nickel, Copper, Zinc, Brass or Bronze.

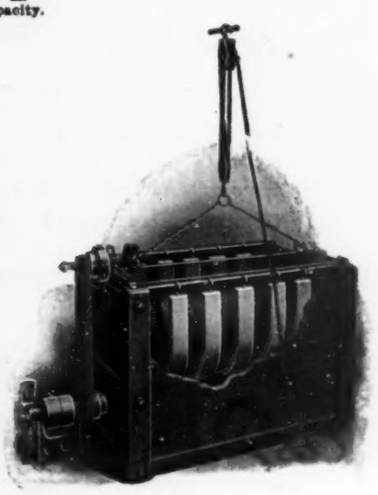
Small sample lots plated free to demonstrate its efficiency.

See cut below.

TWO-BAR SILVERITE NICKEL ANODE

Send for Description.

Also Anodes of all metals made.



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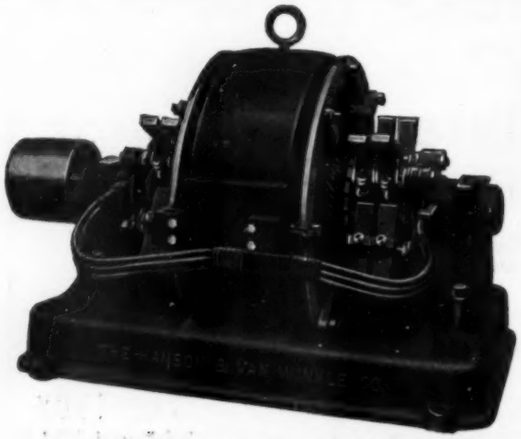

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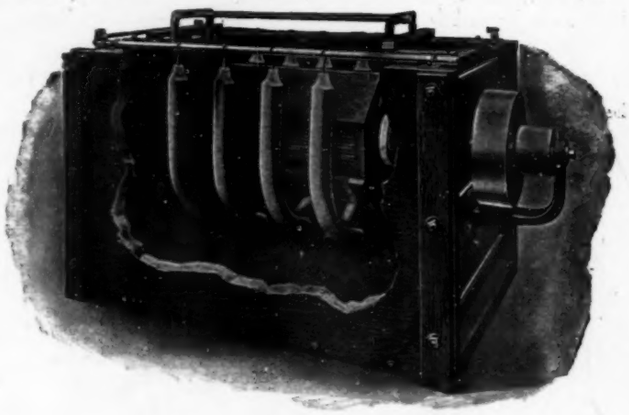

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